PUBLISHED DOCUMENT

PD ISO/TR 28682:2008

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

ICS 03.220.01; 35.240.60

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

Documents
Document Sharing Hub
British Standards

Full document details: PD ISO/TR 28682:2008

National foreword

This Published Document is the UK implementation of ISO/TR 28682:2008.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Road transport informatics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 December 2008

© BSI 2008

ISBN 978 0 580 64781 9

Amendments/corrigenda issued since publication

Date	Comments

Documents
Document Sharing Hub

Full document details: PD ISO/TR 28682:2008

TECHNICAL REPORT

ISO/TR 28682

First edition
2008-11-01

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

Systèmes intelligents de transport — Étude de progrès conjointe APEC-ISO pour élaborer et déployer les normes ITS

Reference number
ISO/TR 28682:2008(E)

Documents
Document Sharing Hub
© ISO 2008

Full document details: PD ISO/TR 28682:2008

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

COPYRIGHT PROTECTED DOCUMENT

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub

Full document details: PD ISO/TR 28682:2008

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Terms and definitions 1

3 Abbreviated terms 1

4 An overview of ITS standards and related key players 4
4.1 Appreciations 4
4.2 Structure of this technical report 4
4.3 Benefits expected from ITS standardization 4
4.4 APEC places high value on ITS standards 7
4.5 ISO/TC 204-ITS: Main international forum developing ITS standards 10
4.6 Related key organizations developing ITS standards worldwide 13
4.7 Summary 22

5 Objectives and methodology 24
5.1 Objectives 24
5.2 Methodology: Two stages of survey 25
5.3 Survey responses from APEC and ISO members 27

6 Survey results 28
6.1 Different approaches to ITS standards development 28
6.2 Different environment in ITS standards development 31
6.3 Status of ITS standards development worldwide 35
6.4 Conformance features of ITS standards 39
6.5 List of ITS standards applied 40
6.6 Lessons learned 40

7 Observations and recommendations 43
7.1 Cooperation between SDOs 43
7.2 Different approaches 44
7.3 Standards development worldwide 44
7.4 Conformance features 45
7.5 ITS standards deployments 46
7.6 Lessons learned 47
7.7 Reaffirming recommendations in the 2001 ITS standards conference 50

8 Summary of recommendations 50
8.1 Review 50
8.2 Recommendations primarily to APEC, EU and major countries 51
8.3 Recommendations to SDOs in General 51
8.4 Recommendations to ISO CS 51
8.5 Recommendations to ISO/TC 204 52
8.6 Recommendations to standards developers within working groups 52

Annex A (informative) **List of ITS standards** 53

Annex B (informative) **List of ITS standards deployed (as of October 2005)** 90
B.1 ITS project category: ITS service domains and service groups (ISO 14813-1 rev) 90
B.2 List of ITS standards deployed in ITS projects (*stage II* survey) 91

Annex C (informative) **Lessons learned** 98
C.1 Lessons learned from Australia (1/3) 98
C.2 Lessons learned from Australia (2/3) 100

Documents
Document Sharing Hub

© ISO 2008 – All rights reserved

Full document details: PD ISO/TR 28682:2008

C.3 Lessons learned from Australia (3/3) 101
C.4 Lessons learned from Canada (1/4) 102
C.5 Lessons learned from Canada (2/4) 104
C.6 Lessons learned from Canada (3/4) 105
C.7 Lessons learned from Canada (4/4) 107
C.8 Lessons learned – Japan (1/2) 108
C.9 Lessons learned from Japan (2/2) 109
C.10 Lessons learned from Korea (1/6) 110
C.11 Lessons learned from Korea (2/6) 112
C.12 Lessons learned from Korea (3/6) 114
C.13 Lessons learned from Korea (4/6) 116
C.14 Lessons learned from Korea (5/6) 117
C.15 Lessons learned from Korea (6/6) 118
C.16 Lessons learned from Switzerland (1/1) 119
C.17 Lessons learned from USA (1/4) 120
C.18 Lessons learned from USA (2/4) 123
C.19 Lessons learned from USA (3/4) 126
C.20 Lessons learned from USA (4/4) 128

Annex D (informative) **2001 ISO ITS conference ouTC omes** 132

Annex E (informative) **ITS standards fact sheet** 135
E.1 ISO/TC 204 – Intelligent Transport Systems 135
E.1.1 ISO/TC 204 WG 1 – Architecture 135
E.1.2 ISO/TC 204 WG 3 – ITS Database technology 146
E.1.3 ISO/TC 204 WG 4 – AVI/AEI 150
ISO/TC 204 WG 5 – EFC/ETC 163
E.1.4 ISO/TC 204 WG 7 –General fleet management and commercial fright operations 171
E.1.5 ISO/TC 204 WG 8 – Public Transport 173
E.1.6 ISO/TC 204 WG 10 – Traffic and Traveller Information 176
E.1.7 ISO/TC 204 WG 14 Vehicle/Roadway Warning Systems 180
E.1.8 ISO/TC 204 WG 16 Wide Area Communications 187
E.2 ISO/TC 211 WG 8 – Location Based Services 200
E.3 ETSI ERM TG37 (Intelligent Transport Systems) 203

Annex F (informative) **List of contacts** 216
F.1 Contact Information – National advisory committee for ISO/TC 204 216
F.2 Contact - ITS organizations 223
F.3 Contact - ITS Government ministry 227
F.4 Contact - Standards developing organizations for ITS 233

Annex G (informative) **Useful links** 238
G.1 International and regional links 238
G.2 National or local links 238

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 28682 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems,* in collaboration with *APEC (Asia-Pacific Economic Cooperation)*.

Documents
Document Sharing Hub

© ISO 2008 – All rights reserved

Full document details: PD ISO/TR 28682:2008

Introduction

This Technical Report is intended to facilitate cooperation in ITS standardization activities by sharing recent information and experience on the application and deployment of ITS standards among APEC economies and ISO/TC 204 member countries.

The developers of this Technical Report:

(1) surveyed the current status of and plans for ITS standards and their deployment to increase understanding and boost technology transfer among APEC and ISO/TC 204 members,

(2) identified common problems that members are facing related to international standardization activities in the technical committee on intelligent transport systems (ISO/TC 204) of the "International Organization for Standardization" (ISO)

(3) Presented an ITS standards policy and collective opinions to improve ITS standardization activities and implementations.

The key questions addressed in this Technical Report are:

- How similar or different are each country's approaches to the development and deployment of ITS standards?
- Who develops ITS standards nationally, regionally and internationally?
- How many ITS standards have been developed worldwide?
- How many international ITS standards have been adopted or applied worldwide?
- What lessons have learned from the development and deployment of ITS standards?
- How to improve the practice of ITS standards development and application?
- What should be done to facilitate universal use of ITS standards?

This Technical Report contains:

- 662 ITS related standards worldwide (developed or under development) (Annex A)
- 89 Fact sheets of ITS related standards (including scope and conformance features) (Annex D)
- 100 ITS standards deployed world wide (Annex B)
- 20 Lessons learned from development or deployment experience of ITS standards (Annex C)
- Observations and Recommendations developing and deploying ITS standards (Section 4, 5, 6, 7, 8)

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

TECHNICAL REPORT ISO/TR 28682:2008(E)

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

1 Scope

This Technical Report

a) provides a survey of the current status and plan of ITS standards and their deployment,

b) identifies common problems which members are facing related to international standardization activities, and

c) provides collective opinions to improve ITS standardization activities and their implementations.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
eSafety
safety systems using electronics and or wireless communications

3 Abbreviated terms

AEI	automatic equipment identification
AFNOR	Association Française de NORmalisation
ANSI	American National Standards Institute
APEC	Asia-Pacific Economic Cooperation
APSC	advisory panel for standards cooperation (ITU)
ASN.1	abstract syntax notation.1
ASTM	American Society for Testing and Materials
AVI	automatic vehicle identification
CD	committee draft (ISO)
CD-ROM	compact disc, read-only memory
CEN	Comite Europeen de Normalisation
CENELEC	Comite Europeen de Normalisation Electrotechnique

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

CTI	committee on trade and investment
DATEX	DATa EXchange
DATEX ASN	DATEX using ASN.1
DIS	draft International Standard (ISO)
DOT	department of transport, department of transportation
ERM	electrotechnical and radio matters
EU	European Union
FDIS	final draft International Standard (ISO)
GIS	geographic information system
HoD	head of delegation
ICT	information and communication technologies
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IS	International Standard (ISO)
ISO	International Organization for Standardization
ITS	intelligent transport systems
ITSEG	ITS expert group
ITU	International Telecommunication Union
JPG	joint project group
JTF	joint task force
KATS	Korean Agency for Technology and Standards
LCR	road command language (France)
MEDIA	Management of Electronic Fee Collection DSRC Interoperability in Alpine Region
MOCT	Ministry of Construction and Transportation (Korea)
MRA	mutual recognition agreement
NAFTA	North America Free Trade Agreement
NP	new work item proposal (ISO)
NPA	National Police Agency (Korea, Japan)
NSB	national standards body
O member	observer member (ISO)

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

ORANGES	Orlando Regional Alliance for Next Generation Electronic payment Systems
OGC	Open Geospatial Consortium
P member	participating member (ISO)
PAS	Publicly Available Specification (ISO)
PC	planning committee (OGC)
PCS	personal communications services
PWI	preliminary work item (ISO)
RFID	radio frequency identification
RTLS	real time locating systems
RTSA	Road Traffic Safety Authority
SAFETEA-LU	Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (USA)
SC	sub committee (ISO)
SCSC	sub-committee on standards and conformance (APEC)
SDO	standards development organization
SMR	specialized mobile radio
TC	Technical Committee (ISO)
TEL WG	telecommunications and information working group (APEC)
TELEMOV	telecommunications related to motor vehicles (ITU APSC)
TPT WG	transportation working group (APEC)
TR	Technical Report (ISO, country)
TS	Technical Specification (ISO, country)
TTA	Telecommunication Technology Association (Korea)
uGIS	ubiquitous GIS
UNECE	United Nations Economic Commission for Europe
VOIP	voice over internet protocol
VTS	Vehicular Technology Society (IEEE)
WG	Working Group (ISO)

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

4 An overview of ITS standards and related key players

4.1 Appreciations

NOTE Sincere appreciation is expressed to all the respondents, who voluntarily contributed to the report surveys. They are:

- Twenty-three members of ISO/TC 204 and APEC: Australia, Austria, Brunei Darussalam, Canada, China, Czech Republic, France, Germany, Hong Kong China, Hungary, Japan, Korea, Mexico, Norway, Peru, Singapore, Slovakia, South Africa, Sweden, Switzerland, Chinese Taipei, UK, USA, and;
- Six organizational representatives: APEC, CEN/TC 278, ETSI/ERM/TG37, IEEE, ISO/TC 211, ITU
- Dozens of contributors from APEC and ISO/TC 204: Chair and delegations of APEC, and Chair, Secretariat, HoDs, WG Convenors, rapporteurs and project editors of ISO/TC 204.

4.2 Structure of this technical report

Section 4 of this Technical Report provides the background of this project and introduces APEC, ISO/TC 204 and other important standards developing organizations for ITS.

Section 5 describes the methodology taken to conduct this project report and the questions and objectives of the two survey stages of this Technical Report.

Section 6 analyses the responses to two survey stages described in section 5. It shows the different approaches to developing standards and discusses implications of the survey results

Section 7 provides observations and conclusions aimed to support ITS standards developers. They are related not only to international standards development organizations, but also individual to members of ISO/TC 204 and APEC such as the government ministries and regulators, national standards bodies, domestic standards organizations, and trade associations, etc.

4.3 Benefits expected from ITS standardization

4.3.1 What are "Intelligent Transport Systems" (ITS) ?

Like many other parts of business and government around the world, the construction and operation of transportation systems is being transformed by computers, sensors, and communications technology – collectively called information technology (IT).

The application of IT to surface transportation is called “Intelligent Transport Systems” (ITS). ITS provides the ability to gather, organize, analyze, use, and share information about transportation systems. In the modern world, this ability is crucial to the effective and economical construction and operation of transportation systems and to their efficient use.

IT can be very helpful in conceiving, planning, and building new parts of the transport system. This use of IT is not specifically ITS, but it is very helpful in laying the groundwork for introducing ITS. ITS is being incorporated by manufacturers in “intelligent equipment ” that can be installed as part of the transportation infrastructure to gather and disseminate traveller information, control traffic signals and variable message signs, electronically collect tolls, and help manage the system

ITS provides vital support in operating transportation systems, including traffic management, pavement monitoring, oversight of system maintenance, and more effectively and reliably managing public transport •

ITS can store and evaluate archived data about the transportation system that is useful to planners who are evaluating transportation system improvements or to others evaluating safety aspects of the roadway

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

ITS also provides a wide array of in-vehicle technology to improve the safety, productivity, and comfort of road travel. In addition, a new direction for ITS in developed countries is worth waTC hing. This is a new focus on using wireless communications to help vehicles and the infrastructure cooperate with each other to enhance safety and the ability to manage the infrastructure well.

ITS encompass a broad range of wireless and wire communications-based information, control and electronics technologies. When integrated into the transportation system infrastructure, and in vehicles themselves, these technologies help monitor and manage traffic flow, reduce congestion, provide alternate routes to travellers, enhance productivity, and save lives, time and money.

ITS provide the tools for skilled transportation professionals to collect, analyse, and archive data about the performance of the system during the hours of peak use. Having this data enhances traffic operators' ability to respond to incidents, adverse weather or other capacity constricting events.

Traffic accidents and congestion take a heavy toll in lives, lost productivity, and wasted energy. ITS enables people and goods to move more safely and efficiently through a state-of-the-art, intermodal transportation system.

Source Information: 1)"ISO/TC 204 Business Plan" (www.iso.org – business plans for public review);
2) "ITS Technical Notes" (World Bank www.worldbank.org - Report no. 35680)

4.3.2 What are International Standards, standards and the role of ISO ?

ISO/IEC Guide 2 defines *standard* as "*document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context".* standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits

Standardization is "*activity of establishing, with regard to actual or potential problems, provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context".* In particular, this activity consists of the processes of formulating, issuing and implementing standards. Important benefits of standardization are improvement of the suitability of products, processes and services for their intended purposes, prevention of barriers to trade and facilitation of technological co-operation.

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three international bodies are most widely recognized for the planning, development and adoption of International Standards: ISO (International Organization for Standardization) is responsible for all sectors excluding electro-technical, which is the responsibility of IEC (International Electrotechnical Commission), and most of the Telecommunications Technologies, which are largely the responsibility of ITU (International Telecommunication Union).

Table 1 International SDOs: ISO, IEC and ITU

	ISO	IEC	ITU
Standardization area	All sectors (excluding IEC,ITU)	Electro-technical	Telecommunication
Members	156 (100: regular)	63 (51: regular)	189+
Technical Groups	733 TC /SCs 2,226 WG /ad hocs	179 TC /SCs 700 teams	ITU-T: 14 SGs+ ITU-R: 7 SGs+ ITU-D : 2 SGs+
Published standards type document	15,649 (IS, TS, TR, PAS, etc)	5,296 (IS, TS, TR, PAS, etc)	ITU-T : 2,900+ ITU-R : 4,500+ (Recommendations)

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

Active Projects	4,009	1,541	N/A
Website	www.iso.org	www.iec.ch	www.itu.int
Relevant European Organization	CEN	CENELEC	ETSI

ISO is a legal association, the members of which are the "National Standards Bodies" (NSBs) of some 140 countries (organizations representing social and economic interests at the international level), supported by a central secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the "International Standard" (IS). An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO technical committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO technical enquiry). ISO and its technical committees are also able to offer the "ISO Technical Specification" (ISO/TS), the "ISO Public Available Specification" (ISO/PAS) and the "ISO Technical Report" (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the "International Workshop Agreement" (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

Source: ISO website (www.iso.org)

4.3.3 Benefits expected from ITS standardization

Standards are a primary enabler of the widespread dissemination of ITS technologies and their safe and consistent use worldwide. Some of the benefits of ITS, built on International Standards, are listed below:

- The primary social, political, and economic benefit offered by ITS is increased safety: fewer and less severe crashes.
- Another primary social and economic benefit is the saving of travel time and cost and the potential for making travel time more productive for business travellers, more agreeable for all travellers. ITS can facilitate use of alternate or multiple travel modes, improving travel times and helping to load-level the transportation system.
- An additional primary benefit is the potential for an improved environment, including air quality and noise abatement. Secondary benefits from a social perspective, but very important from a commercial perspective are increased traveller comfort, convenience, and entertainment.
- Protocols for interconnecting traffic management, emergency response, and other centres across jurisdictions will increase the appeal and effectiveness of such centres.
- Protocols and message sets for delivering traffic and traveller information to vehicles will allow vehicles to receive service seamlessly wherever they are and will broaden the usable collection of data transmission technologies that can be applied to information delivery.
- Universal physical storage formats for map databases will promote interchangeability of storage media (e.g., CD-ROMs) and open markets for custom tailored data content.
- A reference architecture for vehicle and equipment identification along with protocols for electronic toll collection / road use charge devices and for commercial vehicle credentials checking will promote competition in the marketplace and encourage wider and more interoperable deployment of such systems.

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

- An ITS reference architecture promotes the process of defining simple, self-contained, readily interconnected components into more complex intelligent transport systems, opening the market to new applications and simplifying the deployment process.

- A glossary of ITS terms and an ITS data registry will help to reduce confusion in the marketplace and to simplify procurement and deployment activities.

- Performance and test measures/certification for safety-oriented and driver assistance systems (e.g., adaptive cruise control, collision warnings) will help build marketplace confidence in the value, consistency, and reliability of such systems and, when conscientiously implemented, provide a layer of protection against product liability exposure.

In general, global ITS standards will decrease costs and open markets for vehicle and equipment manufacturers, infrastructure operators, etc.

4.4 APEC places high value on ITS standards

4.4.1 APEC

The Asia-Pacific Economic Cooperation, or APEC, is the premier forum for facilitating economic growth, cooperation, trade and investment in the Asia-Pacific region. APEC was established in 1989 to further enhance economic growth and prosperity for the region and to strengthen the Asia-Pacific community.

Since its inception, APEC has worked to reduce tariffs and other trade barriers across the Asia-Pacific region, creating efficient domestic economies and dramatically increasing exports. Key to achieving APEC's vision are what are referred to as the 'Bogor Goals' *of free and open trade and investment in the Asia-Pacific by 2010 for industrialised economies and 2020 for developing economies*. These goals were adopted by leaders at their 1994 meeting in Bogor, Indonesia.

APEC has 21 members - referred to as "Member Economies" - which account for approximately 40% of the world's population, approximately 56% of world GDP and about 48% of world trade. It also proudly represents the most economically dynamic region in the world having generated nearly 70% of global economic growth in its first 10 years.

APEC's 21 member economies are Australia; Brunei Darussalam; Canada; Chile; People's Republic of China; Hong Kong, China; Indonesia; Japan; Republic of Korea; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; The Republic of the Philippines; The Russian Federation; Singapore; Chinese Taipei; Thailand; United States of America; Viet Nam.

Source: APEC website (www.apec.org)

4.4.2 APEC TPT-WG promotes the use of ITS standards

4.4.2.1 APEC TPT-WG strives for the highest standards

Among APEC’s eleven sectoral working groups, the APEC "Transportation Working Group" (TPT-WG) fosters economic development in the Asia-Pacific region through recommendations to increase the efficiency of the regional transportation system.

The work of the TPT-WG is set out in the action program which is derived from the APEC transportation ministers' statements of 1995 and 1997. At the beginning of 1998, three steering committees were established in line with the priority areas of the working group: More competitive transportation industry (including infrastructure); safe and environmentally friendly transporation systems (including new technologies); and human resources development (including training, research and education).

APEC transportation ministers have been striving for the highest possible standards of efficiency, safety, security and environmental sustainability for their transportation systems. This joint policy was expressed in the 2004 TPT ministerial statement.

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

Source: APEC-TPT website (http://www.apec-tptWG.org.cn/)

4.4.2.2 APEC TPT intermodal/ITS "Experts Group" works towards ITS standards requirements

The "APEC Transportation Working Group" recognizes that "Intelligent Transport Systems" (ITS) can contribute much to the region's most significant transportation needs relating to saving lives, time, money, energy and the environment through more effective use of the existing transportation systems and related infrastructure. At the transportation ministers request, the "ITS Experts Group" is working towards ITS standards development arrangements that will allow these benefits to be fully realized.

The goal of the "ITS Experts Group" is to save lives, time, money and the environment through the realization of ITS.

The objectives are to identify ITS standards requirements which are APEC priorities; to facilitate the establishment of ITS standards by ISO which are APEC priorities; to promote the universal use amongst all APEC Economies of ITS standards established by ISO; to share information among APEC economies regarding ITS developments.

The "APEC TPT ITS Experts Group" was merged with its "Intermodal Expert Group" in May 2006 and renamed the "APEC TPT Expert Groups on Intermodal and ITS Experts Group" (IEG).

4.4.2.3 APEC TPT ITS "Experts Group" and ISO/TC 204 collaboration: "Category A Liaison"

APEC TPT-WG , via its ITS experts group, has been cooperating with ISO/TC 204 in ITS standardization activities, and established ISO Category-A liaison relationship.

The summary of joint activities between APEC TPT-WG and ISO/TC 204 is as follows:

First joint workshop of ISO/TC 204 – APEC/ITSEG

Date and venue: 12 Oct 2002 in Chicago, USA

Topics: Common understanding of each group and future action items

The workshop identified a list of possible joint work or action items for considerations

Second joint workshop of ISO/TC 204 – APEC/ITSEG

Date and venue: 17 May 2004 in Vancouver, Canada

Topics: Discussion on public transport and fleet management standards

The workshop identified common interest areas for transit and fleet management standards. The collective needs of APEC economies were raised and discussed.

First joint project – "World Report for ITS standards"

1st Joint project mainly for the year from the year of 2005 and 2006

Project objective

To survey ITS standards developments and implementations

To share case studies and lessons learned among APEC and ISO/TC 204 members

To review ITS standardization activities, mainly ISO/TC 204, for future oriented planning

The final ouTC ome is this Technical Report.

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

4.4.3 APEC TEL-WG works on telematics

The "APEC Telecommunications and Information Working Group" (TEL) aims to improve telecommunications and information infrastructure in the Asia-Pacific region by developing and implementing appropriate telecommunications and information policies, including relevant human resource and development cooperation strategies. This is reflected in the TEL's expanded vision of promoting the transition from an Asia Pacific information infrastructure into the "Asia Pacific Information Society".

"APEC TEL - Telematics Strategy": APEC TEL Ministers, to broaden and deepen business facilitation, called upon the TEL to strengthen work on the development of an APEC information strategy and an APEC telematics strategy in the 2005 APEC TEL ministerial statement.

APEC TEL has also conducted work on other applications areas including telematics and has developed an APEC telematics strategy. APEC TEL has also considered that a project designed to uncover the potential issues involved in this developing market is a vital first step in understanding the impact this new technology will have on the populations in APEC region. Agreements on standards used between economies will be vital in enabling the spread of the usage of telematics. APEC TEL discussed that the trend towards the installation of telematics devices in cars is a growing and potentially profitable market.

Source: APEC-TEL website (www.**apectel**WG.org)

4.4.4 APEC SCSC encourages participation in international standardization process

APEC established the SCSC to achieve the Bogor Goals in the field of standardization. SCSC, under the "Committee on Trade and Investment" (CTI), has been working since 1994 on helping APEC economies to address those key issues and others related issues through several initiatives with the aim to facilitate trade, such as:

- Alignment of national standards with international standards in priority areas
- Improving participation on international standardization process through capacity building activities and through the regional input developed by technical groups
- Encouraging implementation of good regulatory practices in the process of preparation, adoption or review of regulations
- Developing means for conformity assessment recognition in the regulated sector such as "Mutual Recognition Agreements" (MRAs)
- Encouraging the recognition of conformity assessment in the voluntary sector, including the cooperation with the "Specialist Regional Bodies" (SRBs)
- Cooperation on technical infrastructure development
- Enhancing the information exchange and knowledge on matters related to standards and conformance
- Further increasing the transparency and access to information across the APEC region
- Encouraging business awareness and involvement in the whole process.

These activities increase the propensity for a free and open trade and investment, helping economies to grow, create jobs and provide greater opportunities for international trade and investment. In contrast, protectionism usually fosters inefficiencies and gives fewer and costly choices to consumers. Free and open trade helps to lower the costs of production and thus reduces the prices of goods and services - a direct benefit to all.

Source: APEC website (http://www.apec.org/apec/apec_groups/committees/committee_on_trade/sub-committee_on_standards.html)

Documents
Document Sharing Hub

© ISO 2008 – All rights reserved

Full document details: PD ISO/TR 28682:2008

4.5 ISO/TC 204-ITS: Main international forum developing ITS standards

4.5.1 Mission

ISO/TC 204 is responsible for the overall system aspects and infrastructure aspects of intelligent transport systems, as well as the coordination of the overall ISO work program in this field including the schedule for standards development, taking into account the work of existing international standardization bodies.

ISO/TC 204 is working for standardization of information, communication and control systems in the field of urban and rural surface transportation, including inter-modal and multimodal aspects thereof, traveller information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems (ITS) field. Standardization of in-vehicle transport information and control systems is the responsibility of ISO/TC 22 Road Vehicles.

ISO/TC 204's business plan can be downloaded at ISO's website ''Business plans of ISO technical committees open to public review '

See Annex A for the full list of standards developed and under development by ISO/TC 204.

Source: ISO/TC 204 Business Plan (www.iso.org – business plan for public review)
*A new website of ISO/TC 204 is www.isoTC 204.com.

4.5.2 ISO/TC 204 members

ISO/TC 204 has 25 P (Participating) members and 24 O(Observer) members.

ISO/TC 204 is currently chaired by Mr. Michael Noblett (noblett@connexis.com, USA).

ANSI (USA) is serving as the ISO/TC 204 Secretariat and Mr. David Thompson (dthomson@tiaonline.org) in Telecommunications Industry Association (ITA) performs the role on behalf of ANSI..

Table 2. ISO/TC 204 members

P-Members: 25		**O-Members: 24**	
Algeria			
Australia	Japan	Chile	Columbia
Austria	Korea	Croatia	Cuba
Belgium	Malaysia	Denmark	Egypt
Canada	Netherlands	Finland	Greece
China	Norway	Indonesia	Iran
Czech Republic		Ireland	New Zealand
Russian Federation		Pakistan	Philippines
France	Spain	Poland	Romania
Germany	Sweden	Serbia and Montenegro	Singapore
Hungary	South Africa	Slovakia	Sri Lanka
India	Switzerland	Thailand	Trinidad Tobago
Israel	United Kingdom	Turkey	Uruguay
Italy	USA		

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

4.5.3 ISO/TC 204 Organization (12 working groups)

Table 3 ISO/TC 204 working groups

WG	Title	Convenor (Country)
-	TC 204 Chair	M. Noblett (USA)
-	TC 204 Secretariat (ANSI)	T. Messa (USA)
WG 1	Architecture	R.K. Williams (U.K.)
WG 3	ITS database technology	M. Shibata (Japan)
WG 4	Automatic vehicle/Equipment identification	K. Evensen (Norway)
WG 5	Fee & toll collection	J. Engdahl (Sweden)
WG 7	General fleet management & commercial/freight	R. L. Sabounghi (Canada)
WG 8	Public transport/emergency	J. Bartosiewicz (USA)
WG 9	Integrated transport information, management & control	T. Vincent (Australia)
WG 10	Traveller information systems	R. Duckeck (Germany)
WG 11	Route guidance & navigation systems	VACANT (recently inactive)
WG 14	Vehicle/roadway warning & control systems	K. Yamada (Japan)
WG 15	Dedicated short range communications for ITS applications	C. H. Rokitansky (Germany)
WG 16	Wide area communications/protocols & interfaces	T. R. Shields (USA)

4.5.3.1 WG 1 – ITS System architecture, taxonomy and terminology

The mission of ISO/TC 204 WG 1 is to provide ISO/TC 204, its working groups, related bodies, and those involved in the ITS sector with a reference model of Conceptual Reference Architecture(s) that show the structure and interrelationships of the sector and to provide timely and appropriate definitions of Terminologies by means of glossaries and dictionaries, which explain, in plain language and with the minimum of jargon, the terms in use in ITS, and to develop standards for generic AVI(automatic vehicle identification) in the ITS sector. In all of this work, the overall objectives of TC 204, to provide cost efficient enabling structures, are paramount.

4.5.3.2 WG 3 - ITS database technology

The scope of WG 3 is to develop standards for geographic data files - The definition of an application independent standard for interchange of ITS database; Physical storage for ITS Database; The standard for the data models used for the storage of vehicle navigation and traveller information system databases compiled from geographic data file; location referencing procedure - This section of the standards specifies the location referencing procedures for the geographic database. Publishing updates for geographic databases - This section of the standard will specify the formats and procedures for publishing updates of geographic database used in ITS applications

4.5.3.3 WG 4 – Automatic vehicle and equipment identification

The scope of WG 4 is to develop standards for automatic vehicle identification (AVI), automatic equipment identification (AEI) and electronic registration information for ITS.

4.5.3.4 WG 5 - Fee and toll collection

The scope of WG 5 is to working for standardization of information, communication, and control systems in the field of fee and toll collection systems for urban and interurban surface transportation, including intermodal and multimodal aspects.

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

4.5.3.5 WG 7 - General fleet management and commercial/freight

The definition of standards in the areas of WG 7, "Fleet Management and Commercial/Freight operations systems" to improve the management and safety of these fleets and facilitate the interaction between the vehicles/freight operators and the local, national and international authorities within the intermodal and multimodal environments.

4.5.3.6 WG 8 - Public transport/emergency

The scope of WG 8 includes specific publicy transport functions: schedule adherence, driver and passenger safety surveillance and alert, fare collection systems, etc.

4.5.3.7 WG 9 - Integrated transport information, management, and control

The scope of WG 9 includes:

Define the systems that will operate to provide end-users with integrated transport information, management, and control, and to a list the intended functionality of these systems, where there is a need in terms of safety of users, the interoperability of the systems, or compatibility between system.

Define the data-flows between the end-user systems and specify the interfaces between them.

Define the data needs of these end-user systems and, in conjunction with the data providers specify the interfaces between providing and using systems.

Define the final outputs of the end-user systems and specify the form that they should be in to satisfy the end-user needs at their interface.

Define methods for accrediting acceptable systems.

4.5.3.8 WG 10 - Traveller information systems

The scope of WG 10 is concerned with the timely delivery of accurate, relevant information to travellers in a form suitable for them to use. This encompasses the broad range of travel modes in urban, inter- urban, and rural transportation. Travellers should have easy access to complete information about their travel alternatives and accurate information on current and expected travel conditions to enhance their mobility.

4.5.3.9 WG 11 - Route guidance and navigation systems

The scope of WG 11, "Route Guidance and Navigation Systems", provides to the driver orientation and gives route recommendations on how to reach a destination. The systems may also consider the actual traffic situation in providing route recommendations and may also make recommendations regarding alternate travel modes.

When routes are generated in the infrastructure, the in-vehicle system receives the calculated routes via a communication link.

Work items of WG 11 are aimed primarily at motorized individual drivers.

In "Locally Determined Route Guidance", route search and resulting route recommendations are generated in-vehicle, using locally stored map (road network data). Communication interfaces are to be harmonized between locally determined route guidance and dynamic ITS information.

In "Centrally Determined Route Guidance", all necessary information needed for route search and resulting route recommendations are generated in a traffic control centre (e.g., by using historical link journey times supplemented by real-time traffic information data) and subsequently transmitted to the individual driver.

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

4.5.3.10 WG 14 - Vehicle/roadway warning and control systems

The scope of WG 14 Includes the standardization of devices and systems that contribute to any one or more of the following purposes: avoiding crashes; increasing roadway efficiency; adding to driver convenience; reducing driver workload; improving the level of travellers' safety, security, and assistance by using information about the driving environment to perform anyone or more of the following functions: monitor the driving situation; warn of impending danger; advise of corrective actions; partially or fully automate driving tasks; report travellers' distress; and request needed emergency services where emergency services include medical, police, fire, and repair.

Information about the driving environment can come from sensors on board the vehicle, from other vehicles, and/or from the infrastructure. The driving environment includes all external factors that affect the vehicle or its driver including traffic, weather, and road surface conditions.

4.5.3.11 WG 15 - Dedicated short range communications for ITS applications

The scope of WG 15 – "Dedicated Short-Range Communications" (DSRC) describes data exchange between roadside stations (e.g., beacon, interrogator, leakage coaxial cable) and vehicles if equipped with an on-board-unit (OBU). DSRC is able to support many ITS applications already identified by ISO/TC 204. Therefore it will be an essential element of ITS. ISO/TC 204/WG 15 has been constituted to propose a common air interface standard for the DSRC-link.

4.5.3.12 WG 16 - Wide area communications/protocols and interfaces

The scope of WG 16's will be wide area data exchange between control centres and user devices in support of ITS applications. Initially WG 16 will concentrate on message structure and protocol specifications independent of communication medium (e.g., subcarrier technologies, cellular, PCS, satellite, SMR). WG 16 will not define application data elements. WG 16 will serve as a coordinator of message lists provided by the application-oriented working groups, promoting consistent use of data element structures across application messages, as a catalogue of unique message types, and as the definer of the general message structure for wide area communications media appropriate for ITS.

4.6 Related key organizations developing ITS standards worldwide

4.6.1 ISO/TC 204 liaisons

Under the ISO/IEC Directives, a TC /SC in ISO/IEC shall establish and maintain liaison with TC /SCs in ISO/IEC or other international or broadly based regional organizations. ISO/TC 204 has established and maintained liaison with various committees and organizations as follows. This section will serve as introduction to those important liaisons.

Table 4 Liaisons of ISO/TC 204

Internal liaisons	External liaisons
<ISO> • TC 8 Ship and marine technologies • TC 22 Road vehicles • TC 104 Freight containers • TC 154 Electronic data interchange • TC 211 Geographic information and geomatics • ISO/IEC JTC 1 Information technology • ISO/IEC JTC 1/SC31 Automatic identification and data capture techniques • TC 122-TC 104 JWG Supply chain applications of RFID <IEC> TC 9 Electrical railway equipment	• ITU-R Working party 6M – Multimedia broadcasting • ITU-R Working party 8A – Intelligent transport systems • CEN/TC 278 - Road transport and traffic telematics • Asia Pacific Economic Cooperation (APEC) • Institute of Electrical and Electronics Engineers (IEEE) • Open Geospatial consortium (OGC) • UN/CEFACT/TBG3 - UN centre for trade facilitation / International trade and business processes – Transport working group • IrDA (Infrared Data Association) • ETSI / TG37 • World Customs Organization(WCO)

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

4.6.2 CEN TC 278 European ITS standards (formally RTTT)

CEN TC 278 is the European regional organization for ITS standards and basically is interested in all the work of ISO/TC 204. In addition to the general development and provision of standards it has a specific additional role to develop standards to enable the European single market.

Under the Vienna Agreement, ISO/TC 204 and CEN TC 278 have developed and reviewed ITS standards together.

CEN, the European committee for standardization, was founded in 1961 by the national standards bodies in the European Economic Community and EFTA countries. Now CEN is contributing to the objectives of the European Union and European Economic Area with voluntary technical standards which promote free trade, the safety of workers and consumers, interoperability of networks, environmental protection, exploitation of research and development programmes, and public procurement.

CEN TC 278 was formed in 1991 and is working for standardization in the field of telematics to be applied to road traffic and transport, including those elements that need technical harmonization for intermodal operation in the case of other means of transport. It shall support among others: vehicle, container, swap body and goods wagon identification; communication between vehicles and road infrastructure; communication between vehicles; vehicle man machine interfacing as far as telematics is concerned; traffic and parking management; user fee collection; public transport management; user information.

CEN TC 278 has fourteen working groups. Under the Vienna Agreement, ISO/TC 204 and CEN TC 278 are cooperating to develop ITS standards and some of the WG s are CEN led.

Table 5 CEN TC 278 working groups

No	Working group/Sub-group name
1	WG 1 Electronic fee collection
2	WG 3 Public transport
3	WG 4 Traffic and travel information
4	WG 5 Traffic management systems (dormant)
5	WG 7 Geographic data files
6	WG 8 Road databases
7	WG 9 Dedicated short-range communications
10	WG 10 Human-machine interfaces
11	WG 12 Automatic vehicle and equipment identification
12	WG 13 Architecture and terminology
13	WG 14 After theft recovery of stolen vehicles
14	WG 15 eSafety

Source: CEN TC 278 website (www.nen.nl/cen278)

4.6.3 IEEE VTS/ITS for wireless communications for ITS

IEEE VTS/ITS is interested in almost all the activities of ISO/TC 204.

The IEEE is a leading developer of standards that underpin many of today's technologies. IEEE standards are developed in a unique environment that builds consensus in an open process based on input from all interested parties. With nearly 1,300 standards either completed or under development, IEEE is a central source of standardization in both traditional and emerging fields, particularly telecommunications, information technology and power generation

One of the best kept "secrets" is that the "Vehicular Technology Society" (ITS) claims top be the Society for persons engaged in "wireless", also known as, mobile radio, motor vehicles, and transportation electronics. This includes, but is not limited to: 2-way radio, cellular communications, personal communications, multi-media communications, paging, related networks, antennas, propagation, mobile satellite, aeronautical radio, etc. The VTS scope also includes vehicular electronics, including control, navigation, and communication systems. The VTS scope also embraces transportation electronics for railway systems including signalling, and communications.

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

IEEE-SA VTS/ITS - The group concerns itself with land, airborne and maritime mobile services; portable commercial and citizen's communications services; vehicular electrotechnology, equipment and systems of the automotive industry; traction power, signals, communications and control systems for mass transit and railroads.

*Source: IEEE-SA VTS/ITS website (*http://ewh.IEEE.org/soc/vts/)

4.6.4 ISO/TC 22 Road vehicles

ISO/TC 22 is mainly interested in the areas of ISO/TC 204: WG 4 'Automatic vehicle/equipment identification', WG 14 'Vehicle/roadway warning & control systems' and WG 16 'Wide area communications/protocols and interfaces'.

ISO/TC 22 and TC 204 have agreed to establish a joint working group (JWG) to facilitate collaboration for some of the work items of TC 204 WG 4/14/16 and TC 22 SC13 WG 5/8.

ISO/TC 22 is also working closely with "UNECE WP.29 World Forum for Harmonization of Vehicle Regulations".

The main objectives of ISO/TC 22 are as follows:

- To take full responsibility and ensure a world-wide involvement for handling work items relating to road vehicles and their equipment; produce cost-effective standards, which correspond to user and market needs, in due time.
- To support the technical progress of the sector.
- To maintain the collection of 573 published standards and adapt them to technical progress through a 5-year review process.
- To increase the recognition of the work of ISO and of the ISO/TC 22 within the automobile sector.

The vehicle industry is a world-wide industry and the implementation of international standards should limit the cost of producing vehicles and their parts. In every country the construction of vehicles is widely regulated but the harmonization of regulations is under way at the UN WP.29 whose 1958 agreement is open to every country and paved the way for the 1998 agreement. Some major countries have already signed this agreement and WP.29 is preparing world-wide regulations. International Regulations often need the support of international standards that are prepared and issued by ISO.

In accordance with this statement, the automotive industry contributed through ISO standards to the development of new fuel systems as "Compressed Natural Gas" (CNG), "Liquefied Petroleum Gas" (LPG) and in the future "Hydrogen" without forgetting the electrically propelled vehicles.

The ISO/TC 22 standards have also contributed to attaining/maintaining a high level of safety and protection of the environment according to the scope of its subcommittees. Some examples can be given with the crash testing methods, road handling ability testing methods, emissions testing methods and so on.

In all participating countries there is a general tendency to transfer the ISO/TC 22 standards as national standards following the harmonization of the regulations. Cost saving is at stake, as well as the removal of unjustified barriers to trade.

Source: ISO/TC 22 Business Plan (www.iso.org – business plan for public review)

4.6.5 UNECE WP.29 - World forum for harmonization of vehicle regulations

In order to reduce international trade barriers and to promote the global trade of vehicles and their components, efforts are being made to have harmonized vehicle regulations worldwide. The major forum for this role is the "World Forum for Harmonization of Vehicle Regulations" (WP.29) under the "United Nations Economic Commission for Europe" (UNECE).

Documents
Document Sharing Hub

© ISO 2008 – All rights reserved

Full document details: PD ISO/TR 28682:2008

UNECE WP.29 is mainly interested in the area of ISO/TC 204 WG 4 'Automatic vehicle/equipment identification', WG 14 'Vehicle/roadway warning & control systems', and WG 16 'Wide area communications /protocols and interfaces'.

UNECE WP.29 is also closely working with ISO/TC 22 "Road vehicles".

UNECE WP.29 was established on 6 June 1952 as the "Working Party on the Construction of Vehicles", a subsidiary body of the "Inland Transport Committee" (ITC) of the "United Nations Economic Commission for Europe" (UNECE). In March 2000, WP.29 became the "World Forum for Harmonization of Vehicle Regulations (WP.29)". The objective of the WP.29 is to initiate and pursue actions aimed at the worldwide harmonization or development of technical regulations for vehicles. Providing uniform conditions for periodical technical inspections and strengthening economic relations worldwide, these regulations are aimed at:

- improving vehicle safety;
- protecting the environment;
- promoting energy efficiency; and
- increasing anti-theft performance.

WP.29 currently administers three UNECE agreements, namely:

1. **UNECE 1958 Agreement** concerning the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions;

2. **UNECE 1997 Agreement** concerning the adoption of uniform conditions for periodical technical inspections of wheeled vehicles and the reciprocal recognition of such inspections.

3. **UNECE 1998 Agreement** concerning the establishing of global technical regulations for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles;

Vehicles which are sold and put into service in a country have to meet the regulations and standards of that country. The registration procedure of that country requires the approval of the vehicle and/or its components. The existence of separate national regulations and approval procedures in the different countries requires expensive design modifications, additional tests and duplicating approvals. Thus, there is the need to harmonize the different national technical requirements for vehicles and to elaborate a unique international regulation. Once the vehicle or its equipment and parts are manufactured and approved according to that regulation, they can be internationally traded without further tests or approvals. Furthermore, these regulations have to be continuously adapted to the technical progress and to the new requirements regarding safety and environmental protection.

The organization of the" World Forum" and its subsidiary bodies is shown in the chart below:

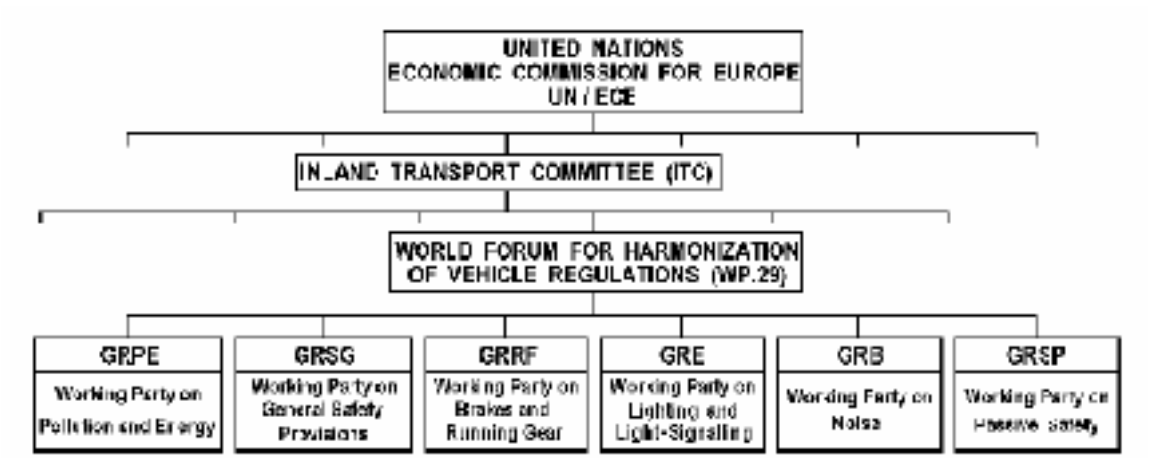

Figure 1 Organization of UNECE WP.29

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

A UNECE regulation in force binds leally all those contracting parties which signed the same regulation. The date of entry into force of a regulation or an amendment to a regulation is given on the front page of the official document as well as in the status document TRANS/WP.29/343.

The contracting party which signed a regulation may issue type approvals according to that regulation and shall recognize the type approvals issued by all other contracting parties which signed the regulation too. For more information please consult Article 12 of the 1958 agreement at http://www.unece.org/trans/main/wp29 /wp29regs.

Source: UNECE WP.29 website (http://www.unece.org/trans/main/welcwp29.htm)

4.6.6 ISO/IEC JTC 1/SC17 – Card and personal identification

ISO/IEC JTC 1/SC17 is mainly interested in the area of ISO/TC 204 WG 5 "Fee & toll collection" and how the SC17 card standards are used in the transportation sector.

ISO/IEC JTC 1/SC17 is also closely working with ISO/IEC JTC 1/SC31 "Automatic identification and data capture techniques", ISO/TC 104 "Freight containers" and ISO/TC 122 "Packaging".

ISO/IEC JTC 1/SC17 is working for standardization in cards and personal Identification. It includes identification and related documents, cards, devices associated with their use in inter-industry applications and international interchange.

SC17 has extended its work cope to test methods, physical characteristics, embossing, magnetic stripe; Integrated circuit cards with contacts, contactless integrated circuit cards; optical memory cards; machine readable travel documents; driver license ID cards and other aspects of personal identification.

Source: JTC 1/SC17 Business Plan (www.iso.org – business plan for public review)

4.6.7 ISO/IEC JTC 1/SC31 - AIDC ("Automatic identification and data capture techniques")

ISO/IEC JTC 1/SC31 is mainly interested in the area of ISO/TC 204 WG 4 ‘Automatic vehicle/equipment identification’, and WG 7 ‘General fleet management & commercial/freight’.

ISO/IEC JTC 1/SC31 is also closely working with ISO/IEC JTC 1/SC17 ‘Card and personal identification’.

The initial priority for SC31 work was in the field of linear bar codes. This area continues to be a major work area with new bar code symbologies being developed and standardized. Existing standards have entered the 5-year review period and are undergoing update to protect their visibility.

Interest in RFID technologies is expanding rapidly. The core RFID standard components for data syntax, tag identification and air interface protocols for five different frequencies were completed and published as formal ISO/IEC standards in 2004. In addition, a new air interface protocol for RFID at UHF developed by major Users and Solution Providers through EPCglobal™ was submitted to the ISO process, early 2005 and will be incorporated into ISO/IEC 18000-6. This coming together of the largest user association in distribution and SC31 is a real credit to all those involved and promises to release the constructive energies in both bodies to accelerate the development and implementation of RFID technology for the greater benefit.

SC31 WG 5, the youngest working group, is developing real time locating systems (RTLS), which are used for vehicle manufacturing and tracking, transportation, distribution and logistics, aerospace and defence.

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

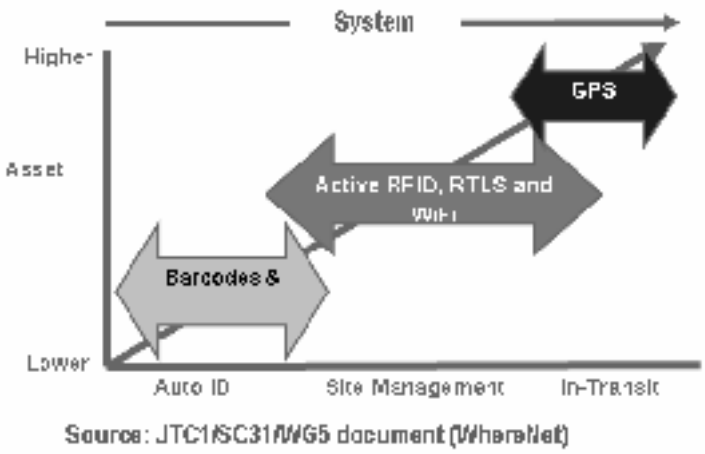

Figure 2 ISO/IEC JTC 1/SC31/WG 5 RTLS - ID and tracking technologies

With the help of its national members, SC31 continues to investigate the business demand for the standardization of other AIDC technologies. Such investigations are being undertaken on a regular basis since needs change quickly. At the SC31 Tokyo plenary in April 2000, a report on "Contact Memory" was given which suggested that there is no current need for standardization. This will be reviewed again in the light of the work being done on direct part marking.

There is growing interest in the use of two dimensional symbologies such as Data Matrix, QR Code and PDF 417, in response to space constraints and the need for expanded data capacity. They are finding a ready place in military, industrial and pharmaceutical applications.

The recent global conflicts and the war on terrorism, has dramatically thrust Auto ID in all its facets, into the forefront of system development. Identification and security at new levels of speed and accuracy are essential technology challenges which must be met.

Source: JTC 1/SC31 Business Plan (www.iso.org – business plan for public review)

4.6.8 ISO/TC 104 Freight containers

ISO/TC 104 is mainly interested in the area of ISO/TC 204 WG 4 "Automatic vehicle/equipment identification" and WG 7 "General fleet management & commercial/freight''.

ISO/TC 104 is also closely working with ISO/TC 122 "Packaging" and ISO/IEC JTC 1/SC31 on RFID issues. ISO/TC 104 has established a joint working group with the ISO/TC 122 on "SCM for RFID".

ISO/TC 104 is working for standardization of freight containers, having an external volume of one cubic meter (35.3 cubic feet) and greater, as with regard to terminology, classification, dimensions, specifications, handling, test methods and marking.

The working scope of ISO/TC 104/SC4 is on Identification and communication - standardization of freight containers visual marks (location, encoding, design and size); identification (identity codes and marks, automatic container identification system, identification transmission protocol); and data elements and their codes for container related communication.

Source: Auto ID website (www.autoid.org – ISO/TC 104)

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

4.6.9 ISO/TC 104-122 JWG – Supply chain management (SCM) for RFID

ISO/TC 122 is working for standardization in the field of packaging with regard to terminology and definitions, packaging dimensions, performance requirements and tests.

ISO/TC 122 is mainly interested in the area of ISO/TC 204 WG 7 "General fleet management & commercial/freight''.

ISO/TC 104 is also closely working with ISOTC 104 "Freight containers" and ISO/IEC JTC 1/SC31 on RFID issues.

This effort to organize a JWG began in the 1st Quarter of 2002, as an effort to ensure a degree of compatibility for various levels of employing RF tags for item identification, product packaging, shipping containers, small returnable containers, and containers greater than one cubic meter. The ISO committees that must be involved include ISO/TC 104 (Freight containers) and ISO/TC 122 (Packaging). The TC 122 and TC 104 committees have been cooperating to develop standards for SCM RFID. This effort has been expanded to invite ISOTC 204 (Road transport information and control systems) and ISO/TC 8 (Ships and marine technology) to participate. It is expected that the technical standards (data carrier, data structure, and conformance) of ISO/IEC JTC 1/SC31 have been employed in many aspects of this work.

Source: Auto ID website (www.autoid.org – ISO JWG)

4.6.10 ISO/TC 211 Geographic information systems

ISO/TC 211 is mainly interested in the area of ISO/TC 204 WG 3 2ITS Database technology". ISO/TC 211 has established a joint task force (JTF) with the ISO/TC 204 to discuss ITS database standards.

ISO/TC 211 is also closely working with OGC ("Open Geospatial Consortium"). It is observed that TC 211 develops relatively abstract standards while OGC develops application/conformance standards.

ISO/TC 211 Geographic information/geomatics is responsible for the ISO geographic information series of standards. Further information about the committee can be found at http://www.iso.org where it is also possible to make contact with the committee secretariat if you have any queries. You can also obtain a copy of the fact sheets and an overview document from this web site.

Many bodies are actively engaged in the work of ISO/TC 211. These include national standardization bodies, the "Open GIS Consortium" (OGC), international professional bodies, UN agencies, and sectoral bodies.

ISO/TC 211 scope is "standardization in the field of digital geographic information". This work aims to establish a structured set of standards for information concerning objects or phenomena that are directly or indirectly associated with a location relative to the earth.

These standards may specify, for geographic information, methods, tools and services for data management (including definition and description), acquiring, processing, analyzing, accessing, presenting and transferring such data in digital/electronic form between different users, systems and locations.

The work shall link to appropriate standards for information technology and data where possible, and provide a framework for the development of sector-specific applications using geographic data.

ISO/TC 211 is organized by five active WG s, several advisory groups, and joint groups with OGC, TC 204, ISO/IEC JTC 1/SC24 :

- WG 4 Geospatial services
- WG 6 Imagery
- WG 7 Information communities
- WG 8 Location based services

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

- WG 9 Information management
- Advisory group on strategy
- Advisory group on outreach
- ISO/TC 211 / OGC Joint advisory group (JAG)
- ISO/TC 204 /TC 211 joint task force (JTF)
- ISO/TC 211 - ISO/IEC JTC 1/SC24 task force

Source: ISO/TC 211 website (www.isoTC 211.org)

4.6.11 Open geospatial consortium

OGC ("Open Geospatial Consortium") is mainly interested in the area of ISO/TC 204 WG 3 'ITS Database technology'.

OGC is also closely working with ISO/TC 211 GIS.

OGC is an international industry consortium of 308 companies, government agencies and universities participating in a consensus process to develop publicly available interface specifications. OpenGIS® Specifications support interoperable solutions that "geo-enable" the Web, wireless and location-based services, and mainstream IT. The specifications empower technology developers to make complex spatial information and services accessible and useful with all kinds of applications.

There are three major groups, called committees: the "Technical", "Planning" and the "Strategic Management Advisory" committees.

The technical committee is responsible for all aspects of the formal consensus OGC specification process. The consortium is composed of three committees and one sub-committee. The "Planning Committee" (PC) has ultimate responsibility for approving technical committee recommendations for the adoption and release of specifications, and for specification program planning. The "Strategic Member Advisory Committee" is conceived to be a permanent committee within the OGC organization, designed specifically to provide strategic members the opportunity to participate in the strategic planning processes of the Consortium, and to support consortium operations aimed at achieving the corporation's mission as defined in the bylaws.

Under the "Planning Committee" (PC), there is a subcommittee named "Conformance Testing & Interoperability Evaluation SC " (CTIE SC). The CTIE subcommittee will provide guidance to and advise the OGC staff on the operation of the "Conformance Testing and Interoperability Evaluation Program" (CTIEP) of the consortium. The sub-committee will provide a forum for an open, consensus discussion regarding approaches and issues related to conformance and interoperability testing becoming an integral component in the OGC specification process. Further, the sub-committee can work with members and OGC staff to insure there is a well understood process in place to insure that vendors can achieve OGC certification in a timely, cost effective manner. It will also serve as the portal for members to provide support directly to the CTIE process.

Source: Open Geospatial Consortium (www.opengeospatial.org)

4.6.12 International telecommunications union (ITU)

The "International Telecommunication Union" (ITU) includes the activities under the R-sector, T-sector and "Advisory Panel on Standards Collaboration (APSC)". It is very important to highlight those different working parties in the R-sector, or study groups in the T-sector are interested in specific TC 204 working groups.

ITU-R WP6M is mainly interested in the area of ISO/TC 204 WG 10 'Traveller information systems (broadcasting).

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

ITU-R WP8A is interested across all communication systems such as the work of WG 15 'Dedicated short range communications for ITS applications' and WG 16 'Wide area communications/protocols & interfaces'.

ITU-APSC is mainly interested in the area of ISO/TC 204 WG 14 'Vehicle/roadway warning & control systems' of ISO/TC 204.

Source: ITU website (www.itu.int)

4.6.12.1 ITU-T is interested in eCall, HMI related standards

The ITU telecommunication standardization sector (ITU-T) is one of the three Sectors of the International Telecommunication Union (ITU). ITU-T's mission is to ensure an efficient and on-time production of high quality standards ("Recommendations") covering all fields of telecommunications.

In the ITU-T-sector, several study groups (SG) deal with network related issues, including network security. Also, there are interests to collaborate with ISO (in general) regarding the work on eCall and HMI(Human Machine Interfaces)-related standards. ITU-T also hosts ITU APSC TELEMOV (see 4.6.12.3 below). More Information can be found at www.itu.int/ITU-T.

Source: ITU-T website (www.itu.int/ITU-T)

4.6.12.2 ITU-R WP6M and WP8A

The ITU radio-communication sector (ITU-R) plays a vital role in the management of the radio-frequency spectrum and satellite orbits, finite natural resources which are increasingly in demand from a large number of services such as fixed, mobile, broadcasting, amateur, space research, meteorology, global positioning systems, environmental monitoring and, last but not least, those communication services that ensure safety of life at sea and in the skies. More Information can be found at www.itu.int/ITU-R.

In WP6M, there are many activities that impact the work in TC 204/WG 10 on TPEG, in cooperation with the European Broadcasting Union. ITU-R WP6M deals with multimedia broadcasting systems.

ITU-R WP8A deals with "Land Mobile Communication Systems". In WP8A, there are many on-going draft working documents and other activities on next generation ITS radio communication services which relate to the work on CALM in ISO/TC 204/WG 16, such as the CALM M5, CALM Millimetre Wave, and CALM broadband.

Other working parties in the R-sector deal with satellite communication issues, GPS and other navigational issues, spectrum management, etc.

Source: ITU-T website (www.itu.int/ITU-R)

4.6.12.3 ITU-APSC TELEMOV for telecommunications standards for motor vehicles

Advisory standards cooperation panel (Advisory Panel for standards Cooperation on Telecommunications related to Motor Vehicles - APSC TELEMOV) is hosted by ITU-T and was created as a result of the "Workshop on Standardization in Telecommunication for Motor Vehicles" and intended as a cooperation group on all aspects of standardization related to telecommunications within and for motor vehicles.

This is meant as an open forum to bring together the leading international standardization organizations as well as industry consortia, as partners engaged in advancing ITS and vehicular telematics standards.

The goal is to strengthen cooperation amongst the SDOs involved in the industry, to improve information exchange between organizations and avoid duplication of efforts as well as to identify open issues in standardization activities and stimulate cooperation on how and where to best address those open issues.

Also, under the auspices of the TSB, an "Advisory Panel on Standards Collaboration" (APSC) coordinates ITS activities among international and regional standards groups.

Source: ITU-APSC (http://www.itu.int/ITU-T/special-projects/apsc/index.html)

Documents
Document Sharing Hub

© ISO 2008 – All rights reserved

Full document details: PD ISO/TR 28682:2008

4.6.12.4 ITU publishes 'Recommendations' not standards

The ITU publishes RECOMMENDATIONS (not standards), that are “recommended” for implementation by different countries. Under other circumstances, some ITU items are mandated for interoperability reasons within different countries, as the ITU is a TREATY-based organization, unlike ISO. In addition to the list provided in this Technical Report, there are definitely other ITU Recommendations that are not ITS-specific, but that impact the development and deployment of ITS services. For example, ITU "Recommendations" on 3G systems, ITU "Recommendations" on broadcasting services that impact the deployment of ITS travel and traveller information services, etc.

4.6.13 ETSI ERM/TG37 - ITS telecommunication standards

The "European Telecommunications Standards Institute" (ETSI) is an independent, non-profit organization, whose mission is to produce telecommunications standards for today and for the future. Based in Sophia Antipolis (France), ETSI is officially responsible for standardization of information and communication technologies (ICT) within Europe. These technologies include telecommunications, broadcasting and related areas such as intelligent transportation and medical electronics. It develops standards against which European regulators bodies (such as CEPT) can recommend regulations to member countries and those countries can measure and enforce the regulation. As with CEN TC 278, in addition to the general development and provision of standards ETSI has a specific additional role to develop standards to enable the European single market.

The activities of ETSI ERM/TG37 are to develop telecommunications (wireless and wired) standards for intelligent surface transport systems. As ETSI's focus is telecommunications standards, ETSI ERM/TG37 work is mainly involved in the area of ISO/TC 204 WG 15 ‘Dedicated short range communications for ITS applications’ and WG 16 ‘Wide area communications/protocols & interfaces’, however, it is also involved in the development of communications dependent services such as emergency crash notification and road pricing.

ETSI unites 688 members from 55 countries inside and outside Europe, including manufacturers, network operators, administrations, service providers, research bodies and users - in fact, all the key players in the ICT arena. ETSI plays a major role in developing a wide range of standards and other technical documentation as Europe's contribution to world-wide ICT standardization. This activity is supplemented by interoperability testing services and other specialisms. ETSI's prime objective is to support global harmonization by providing a forum in which all the key players can contribute actively. ETSI is officially recognized by the European Commission and the EFTA secretariat.

Source: ETSI website (www.etsi.org)

4.7 Summary

4.7.1 Common interest areas of SDO's

This Technical Report observes that those SDOs could be categorized considering their common interested areas on ITS as follows:

Category I – developing ITS standards in various sectors (many of TC 204 WG s)

- ISO/TC 204 (International)
- CEN TC 278 (Regional; Europe)
- IEEE VTS/ITS (International but with a heavy emphasis on North America region)

Category II – developing ITS standards related to vehicle (TC 204 WG 4, 7, 14)

- ISO/TC 22 (Vehicle in general): International
- ISO/TC 104 (Freight containers): International

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

- ISO/TC 122 (Fleet management): International
- UNECE WP29 (Vehicle in general): International

Category III – developing ITS standards related to map-database (TC 204 WG 3)

- ISO/TC 211 (GIS in general): international
- OGC (GIS in general): international, private consortium

Category IV – developing ITS standards related to telecommunications (TC 204 WG 15, WG 16)

- ITU-R WP8A (Broadcasting, TC 204 WG 10): international
- ITU-R WP6M (telecommunications): international
- ETSI ERM TG37(telecommunications): European Union plus 30 other countries

Category V – developing ITS standards related to identification (TC 204 WG 4, WG 5)

- ISO/IEC JTC 1/SC17 (smart card identification): international
- ISO/IEC JTC 1/SC31 (RFID, RTLS): international

The following table compares the interested areas of the SDOs with the work scope of ISO/TC 204 WG s.

Table 6 MaTC hing: ISO/TC 204 WG s and relevant SDOs

TC 204	Standardization Area	Relevant SDOs
WG 1	**Architecture, taxonomy , glossaries, data registries**	CEN TC 278, IEEE VTS/ITS
WG 3	**ITS Database technology**	CEN TC 278 ISO/TC 211, OGC
WG 4	**AVI/AEI/ERI**	CEN TC 278 ISO/TC 22, TC 204, TC 122, UNECE WP29 ISO/IEC JTC 1/SC17, JTC 1/SC31
WG 5	**EFC/ETC**	CEN TC 278, IEEE VTS/ITS JTC 1/SC31
WG 7	**General fleet management and commercial/freight**	CEN TC 278, IEEE VTS/ITS ISO/IEC JTC 1/SC31 ISO/TC 22, TC 204, TC 122, UNECE WP29 (ISO/TC 154, UN/CEFACT/TBG3, WCO)
WG 8	**Public transport/emergency**	CEN TC 278, IEEE VTS/ITS JTC 1/SC17
WG 9	**Integrated transport information, management and control**	CEN TC 278, IEEE VTS/ITS
WG 10	**Traveller information**	CEN TC 278, IEEE VTS/ITS, TPEG Forum, (EBU) ITU-R WP6M
WG 11	**Route guidance and navigation systems**	CEN TC 278 ISO/TC 22, UNECE WP29
WG 14	**Vehicle/roadway warning and control systems**	CEN TC 278, IEEE VTS/ITS JTC 1/SC31 ISO/TC 22, UNECE WP29 (ITU-T)
WG 15	**DSRC**	CEN TC 278, IEEE VTS/ITS ITU-R WP8A, ETSI ERM/TG37 (ISO/IEC JTC 1/SC31), (IrDA)
WG 16	**Wide area communications**	CEN TC 278, IEEE VTS/ITS ITU-R WP8A, ETSI ERM/TG37, (IrDA) (ISO/TC 22, UNECE WP29)
Others	**-**	CEN TC 278: After theft, eSafety ISO/IEC JTC 1/SC31: RTLS ISO/TC 8 : Ship and marine IEC TC 9: Electrical railway equipment IEEE: Rail transit

Documents
Document Sharing Hub

© ISO 2008 – All rights reserved

Full document details: PD ISO/TR 28682:2008

4.7.2 Cooperation between SDOs

Some SDOs have formal liaison arrangements, in other areas the situation is less clear, and in some cases the situation appears almost competitive.

ISO/TC 204 has a unique relation with CEN TC 278 under the Vienna agreement, and several of their WG s are operated as joint working groups (notably Architecture, AVI/ERI, electronic fee collection, traveller information). Other WG s operate separately, but with a very high level of document exchange and interaction on items of common interest.

However, CEN TC 278 WG 14 is for "After Theft" systems has no equivalent WG in ISO/TC 204 or other SDOs. ISO/TC 204 WG 14 “Vehicle/roadway warning and control systems” and WG 16 “Wide area communications”, have no exact counter work programme in CEN TC 278. The recently established CEN TC 278 WG 15 "eSafety" has no direct equivalent in ISO/TC 204, but it is anticipated that the CEN TC 278 WG 15 will deal with safety related communications issues such as "Emergency Crash Notification", or continuous communications with vehicles to support safety systems, which are at the core of ISO/TC 204 WG 16 activities, and will no doubt provide the CEN input to ISO/TC 204 WG 15.

ISO/TC 204 and ETSI have a formal liaison and close working relationship. In respect of continuous communications with vehicles, there are frequent shared meetings in addition to document sharing. ETSI similarly has a formal liaison with CEN TC 278.

There is similarly a formal liaison between ISO/TC 204 and ISO/TC 22, principally to determine which TC deals with which issues. However, ISO/TC 22 and TC 204 have agreed to establish a joint working group (JWG) and collaborate in the area of ISO/TC 204 WG 4/14/16 and ISO/TC 22 SC13 WG 5/8. ISO/TC 204 and TC 211 established a "Joint Task Force" to coordinate any duplicated efforts and to harmonize the standards between TC 211 and TC 204.

Other liaisons tend to work more at a WG level, for example, the liaison between ISO/TC 204 WG 4 and TC 104 in respect of AEI.

Other working relationships are more distant, even where a formal liaison exists, and rely on common membership of both groups. Relationships between IEEE and ISO/TC 204 fall into this category, similarly the links between ISO/TC 204 and UNECE WP29.

It is clear that the relationships between ISO/TC 204 and relevant SDOs could be improved. Particularly, the one between IEEE and ISO/ CEN/ETSI could be better and more efficient. ITU host a cooperation panel between ITS SDOs (APSC TELEMOV) which is largely devoted to information exchange and joint SDO sponsored education and ITS standards promotion events. However ITU-T and ITU-R tend to do their own thing with little attempt to coordinate work programmes with ISO and CEN, although there is a better link with ETSI. The reasons for this are largely historical from the days when telecommunications standards were a completely separate business area from application standards. In these interconnected days, the boundaries are much less clear and there is a need for better cooperation.

5 Objectives and methodology

5.1 Objectives

As expressed in the introduction, the key questions of this Technical Report are:

- How much similar or different when each country approaches to development or deployment of ITS standards?
- Who develops ITS standards nationally, regionally and internationally?
- How many ITS standards have been developed worldwide?
- How many international ITS standards have been adopted or applied worldwide?

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

- What lessons learned from the experience in development and deployment of ITS standards?
- How could we improve the ITS standards development and application practice?
- What should be done to facilitate universal use of ITS standards?

Based on the questions, the objectives of this Technical Report are:

(1) To survey current status and plan of ITS standards and its deployment in order to increase understanding and boost technology transfer among APEC and ISO/TC 204 members;

(2) To identify common problems which members are facing, if any, particularly related to international standardization activities represented by ISO/TC 204;

(3) To demonstrate an ITS standards policy and collective opinions to improve ITS standardization activities and its implementations.

5.2 Methodology: Two stages of survey

To develop this Technical Report, a joint project group (JPG) between APEC and ISO was organized.

The JPG has agreed to perform a comprehensive international survey based upon a uniform table of contents for comparing each member's experiences, strategies, and policies related to ITS standards. This survey will consider the APEC Region but also other global regions (e.g. Europe) represented by ISO/TC 204 members. Also, The JPG agreed to conduct the survey in two stages.

The target groups are the members of APEC and ISO/TC 204. Particularly, the JPG expected active participation in the survey from ISO/TC 204 P members as they are the group which have been participating in international standards development in ITS.

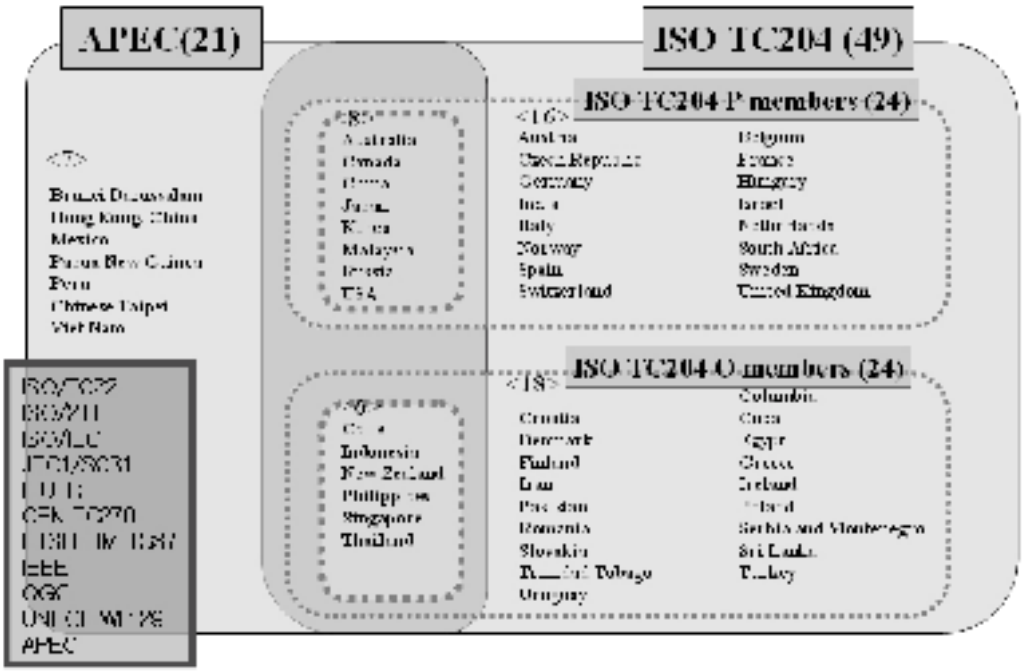

Figure 3 Survey target group: APEC, ISO/TC 204 and its liaisons

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

The 1st stage is basic survey consisting of an inventory of international and national standards for ITS either published or in development.

The 2nd stage is a more detailed and advanced survey which includes case studies and needs and suggestions on ITS standardization activities.

The JPG collected information with the two stages of survey, meeting discussion as well as reviewing existing information.

5.2.1 *Stage I* survey

The 1st stage is basic survey consisting of an inventory of international and national standards for ITS either published or in development. The fundamental question in *stage I* survey is “How could you help somebody (or group) use the ITS standards you developed (this is the reason why we develop standards)?”.

Therefore, the questionnaire for *stage I* is composed of following three parts

The target groups of *stage I* survey were APEC and ISO/TC 204 members and ISO/TC 204 liaisons

- How do you develop your national ITS standards (approaches)?
  - Standards development /adoption process
  - National law, committee, report related to ITS
- What kinds of standards are existing in the world (development status)?
  - International and regional
  - National and association
- How do I extend possible further questions (contact information)?
  - ISO/TC 204 domestic committee
  - ITS organization, Government, ITS organizations, SDOs.

5.2.2 *Stage II* survey

The 2nd stage is a more detailed and advanced survey which includes case studies and lessons from ITS standardization activities: development and deployment of ITS standards.

The fundamental questions in *stage II* survey are “Which standards are used in ITS projects?", and " Which lessons do you learn from the experience in development or deployment of ITS standards?”

The target groups of *stage II* survey were APEC and ISO/TC 204 members, ISO/TC 204 convenors and liaisons.

- *Stage II* survey - Type A was designed for APEC and ISO/TC 204 members and asked members:
  - To *share experience* on ITS standards development/implementation by providing:
    - List of projects of ITS standards employed
    - Write up lesson learned template
  - To *provide the list of projects* any ITS standards implemented
    - Not asking comprehensive answers, only a few list of projects available
  - To *share your experience* with lessons learned
  - To *clarify* the adoption process of International or regional standards as national standards

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

- *Stage II* survey - Type B was designed for TC 204 WG convenors and liaisons and asked them:
  - To *assist* users understand what the standard is about
  - To *provide* test methods (needs) of the standard
  - To *share* your experience with lessons learned
  - To *provide* the scope of ITS standards
  - To *explain* the development status of conformance requirements (how to test?)

5.3 Survey responses from APEC and ISO members

In *stage I* survey, twenty one members from APEC and ISO/TC 204 participated in the *stage I* survey and the liaison officers of ISO/TC 211, ITU, CEN, ETSI, IEEE contributed.

In *stage II* survey, seventeen members from APEC and ISO/TC 204 participated. It should be noted that special contribution of the ISO/TC 204 convenors of WG 1, WG 4, WG 5, WG 7, WG 8, WG 10, WG 14, WG 16 of ISO/TC 204, and to the liaison officers of ISO/TC 211 and ETSI who contributed to the *stage II* survey by providing the fact sheets of the standards developed by the working groups or liaisons.

Also, seven members of APEC and ISO/TC 204; Australia, Canada, France, Japan, Korea, Switzerland and USA should take sincere appreciation for their inputs on 'Lessons learned'. In total, twenty lessons were collected from one hundred projects cases which deployed ITS standards.

Table 7 Survey Response Summary

No	Economy	APEC members	ISO/TC 204 members	*Stage* I survey (21)	*Stage* II survey(17)
1	Australia	APEC	TC 204 - P	√	√
2	Austria		TC 204 - P	√	√
3	Brunei Darussalam	APEC			√
4	Canada	APEC	TC 204 - P	√	√
5	China	APEC	TC 204 - P	√	√
6	Chinese Taipei	APEC		√	√
7	Czech Republic		TC 204 - P	√	
8	France		TC 204 - P		√
9	Germany		TC 204 - P	√	
10	Hong Kong, China	APEC		√	√
11	Hungary		TC 204 - P	√	√
12	Japan	APEC	TC 204 - P	√	√
13	Korea	APEC	TC 204 - P	√	√
14	Mexico	APEC		√	
15	Norway		TC 204 - P	√	
16	Peru	APEC		√	√
17	Singapore	APEC	TC 204 - O	√	√
18	Slovakia		TC 204 - O	√	
19	South Africa		TC 204 - P	√	√
20	Sweden		TC 204 - P	√	
21	Switzerland		TC 204 - P	√	√
22	United Kingdom		TC 204 - P	√	√
23	USA	APEC	TC 204 - P	√	√

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

6 Survey results

6.1 Different approaches to ITS standards development

The different approaches to ITS standards development discussed in this section relate to:

1) How a country or economy develops or contributes to development of ITS standards (through national, regional or international standards development organizations (SDO)) and

2) How a country or economy adopts the ITS standards it needs (automatically or selectively from among the standards development options mentioned in 1) above).

This section reports on the responses received from the *stage I* survey. The results are based on the 20 responses to the *stage I* survey plus 3 additional inputs received as part of the *stage II* survey (Brunei Darussalam, France, Hungary). Note that for the purpose of this section, ITS standards include both SDO developed standards as well as non-SDO developed source materials used as guidance for ITS implementations (see question 3.2 in *stage I* survey in Annex H).

6.1.1 Does your country develop national ITS standards?

The survey results indicate that 14 of the 23 countries responded that they develop national ITS standards or guidance materials. These include 3 very large economies (China, Japan, USA), 6 APEC economies (Australia, Canada, Chinese Taipei, Hong Kong, Korea, Mexico), 4 European economies (Czech Republic, Hungary, Sweden, Switzerland) and South Africa.

The other 9 countries responded they do not develop national standards (or did not respond to the question). These countries included 6 members and associates of the E.U. (Austria, Germany, Norway, Slovakia, Sweden, United Kingdom), and 3 very small economies (Brunei Darussalam, Peru, Singapore). The 6 members of the E.U. cooperate together in the development of ITS standards as part of CEN, the European standards organization. The other 3 countries are relatively small economies for which ITS standards development on their own is uneconomic.

6.1.2 Does your country adopt international or regional ITS standards?

In the *stage I* survey, 9 of 23 countries responded they adopt ITS standards automatically. All 9 of these countries are members of or close neighbours of the E.U. (Austria, Czech Republic, France, Hungary, Norway, Slovakia, Sweden, Switzerland, United Kingdom). The E.U. has a requirement that its member states adopt CEN standards as they are completed. These 9 countries also reported that they adopt CEN standards automatically. This regional cooperation results in region-wide application of ITS standards and economy of effort in the development phase of standards.

There were 8 countries that responded they adopt ITS standards selectively (Australia, Canada, China, Chinese Taipei, Hong Kong, Japan, Korea, USA). This indicates that these countries do not enforce adoption of specific ITS standards but allow flexibility for local discretion. This may be essential for countries with large land areas (Australia, Canada, China, USA) with various climatic, social and economic conditions and for countries with dense populations with a variety of local social and economic conditions (Chinese Taipei, Hong Kong, Japan, Korea). It also enables these countries to selectively adopt ISO International Standards as well as national ITS standards.

Some of the 9 countries that have automatic adoption of CEN ITS standards also have automatic adoption from other standard development organizations. For example, ISO standards are automatically adopted by Czech Republic and Sweden, and ETSI standards are automatically adopted by Norway and United Kingdom.

There are 6 countries that did not respond to the question and additional information is required to determine their position on this issue (Brunei Darussalam, Germany, Mexico, Peru, Singapore, South Africa). They are listed as recognizing ITS standards.

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

Table 8 Different approaches to ITS standards development

No	Economy	APEC members	ISO/TC 204 members	Develop National's	ITS Std. Auto.	Adoption Selective
1	Australia	APEC	TC 204 – P	√		√
2	Austria		TC 204 – P		CEN	
3	Brunei Darussalam	APEC				
4	Canada	APEC	TC 204 – P	√		
5	China	APEC	TC 204 – P	√		√
6	Chinese Taipei	APEC		√		√
7	Czech Republic		TC 204 – P	√	ISO,CEN	
8	France		TC 204 – P	√	CEN	
9	Germany		TC 204 – P			
10	Hong Kong, China	APEC		√		√
11	Hungary		TC 204-P	√	CEN	
12	Japan	APEC	TC 204 – P	√		√
13	Korea	APEC	TC 204 – P	√		√
14	Mexico	APEC		√		
15	Norway		TC 204 – P		CEN,ETSI	
16	Peru	APEC				
17	Singapore	APEC	TC 204 – O			
18	Slovakia		TC 204 – O		CEN	
19	South Africa		TC 204 – P	√		
20	Sweden		TC 204 – P		ISO,CEN	
21	Switzerland		TC 204 – P	√	CEN	
22	United Kingdom		TC 204 – P		CEN,ETSI	
23	USA	APEC	TC 204 – P	√		√

6.1.3 Summary

A summary of the country responses to the two issues reviewed in this section is presented in the following chart.

The chart shows that there are clearly two clusters of countries representing two quite different approaches to developing and adopting ITS standards. These two approaches are:

1. The European approach of countries who do not develop their own national ITS standards but work together through CEN, a regional standards development organization, and then automatically adopt the regional ITS standards from CEN as their national ITS standards; and
2. The APEC approach, championed by most other countries outside of Europe, that develop national ITS standards, either a limited number or a comprehensive set, and then adopt ITS standards selectively as national ITS standards as required.

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

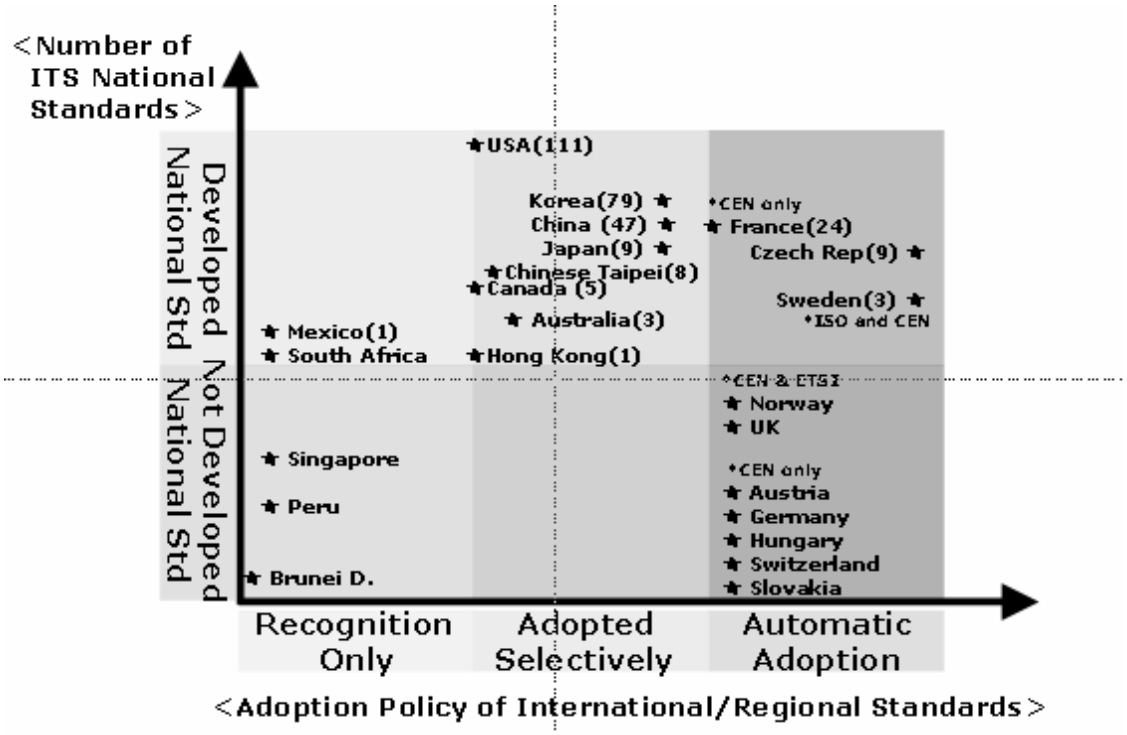

Figure 4 Different approaches to ITS standards development

Notes: Countries are coded according to their responses to two questions (1. Do you develop national ITS standards (including source materials? (No. is shown in parentheses); 2. Do you adopt ITS standards automatically or selectively (with source SDO(s) shown with *mark). Countries that did not answer the second question are listed under “Recognition”.

The existence of two approaches is well known in the ITS standards community. The results of the *stage I* and *stage II* surveys confirm these two approaches apply to ITS standards as well. In particular, the success of the European approach to develop ITS standards and get them introduced into practice quickly is well known and is a model that other regions of the world might find useful to emulate.

However, the countries in the non-European cluster do not have a mechanism like the EU to enforce adoption of standards. Also, they will likely wish to retain the flexibility to adopt ITS standards selectively. One reason is that international standards do not always reflect the particular needs of a country and some adaptation is necessary. Also, there is not a mechanism similar to CEN for non-European countries to use to coordinate closely the joint development of the standards they use. Therefore, these countries should focus on the benefits of closer regional cooperation to develop ITS standards and look for ways to accomplish this. Since all of the countries in the non-European cluster are located in the Asia-Pacific region and are already members of ISO/TC 204, this organization would be an appropriate one to use as a mechanism for greater regional as well as international ITS standards development cooperation.

It should be noted that some countries, most notably the U.S., have no general process for formally adopting ISO International Standards on a national basis. With rare exceptions, all standards usage in the U.S. is voluntary, whether the standards come from ISO or from domestic standards development organizations. In practice, American industry makes considerable use of ISO International Standards, including ISO ITS International Standards, but this use is market driven, and the decision is made individually by each company whether to adopt a standard for its products. In some cases, particular standards will be part of the stated requirements for a system being developed by a government agency or a private company. However, this does not constitute formal adoption of the standard on any larger basis than the project in question. In the U.S., the U.S. Dept. of Transportation has the statutory authority to mandate the use of a particular standard in ITS applications for which it provides funding, but in practice, it has done so only in one case, namely for the RF tags used for commercial vehicle credentials checking and safety clearance.

Documents
Document Sharing Hub
© ISO 2008 – All rights reserved
Full document details: PD ISO/TR 28682:2008

In Europe, the adoption of CEN standards by EU members is automatic. All CEN standards take precedence over national standards and countries, and in order to facilitate EU single market, any competing national standards must be phased out over a reasonable period of time. Adoption of ISO International Standards is generally voluntary, although most are normally adopted by most countries. In the European context "adoption" means that the national standards bodies publish the standards as ISO/National standards (e.g. IS/BS xxxxxx)

In both cases, unless a "Harmonised" EN standard is developed for a strategic area mandated by the EU (and there are not that many of these), the *USE* of standards, either CEN or ISO is voluntary. To be clear, this means that although a CEN or ISO standard may exist, there is no mandatory requirement to use it (unless it is a "Harmonised" standard).

This equates very much to the situation in USA regarding international standards- they are there and are frequently used but are not required. The closest thing to requirement is that for the tendering of public contracts in Europe "Available relevant standards must be taken into account".

Therefore while European Countries have largely responded "Adopted unless there is a National reason not to do so" , in practice in implementation this means the same as the US response "available but not adopted", because the use is voluntary and not mandated.

In many cases, in the ITS arena and elsewhere, a particular standard can be both a CEN standard and an ISO International Standard, having been developed jointly by both organization under the Vienna Agreement between the two organizations.

6.2 Different environment in ITS standards development

6.2.1 General

ITS standards are developed and adopted within a transportation development and social and economic environment within each country. This context is an important determinant of the standards development decisions as reflected in the responses to the questions in section 6.1. In this section 6.2, the broader context for ITS standards development in each country is explored. The *stage I* survey asked questions about a country's ITS laws, plans, national ITS organizations, standards strategy and ITS reporting. Specifically, the responses to each of the following questions in the *stage I* survey are reviewed:

1) Does your country have a national ITS law or Act?
2) Does your country have a national ITS basic or master Plan?
3) Does your country have a national ITS plan council?
4) Does your country publish a regular report on national ITS implementation?

5) Does your country have a national ITS organization?

6) Does your country have a national ITS standardization strategy?

7) Does your country have an ISO/TC 204 domestic committee?
8) Does your country publish a regular ITS standards report?

6.2.2 ITS law/act directly related to ITS? (4/21 or 19%)

Only 4 countries (Austria, Czech Republic, Korea, USA) or 19% of respondents reported that they have a law or act governing the implementation of ITS in their jurisdiction. Such legislation sets a very high standard for governing the implementation of ITS and imposes requirements on the ITS community. The following example highlights the SAFETEA-LU Act passed by the United States Congress in 2005 illustrates the nature of such legislation.

The "Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users" (SAFETEA-LU) is an act to govern the federal governments role in the transportation activities of the nation. The funding for the activities under the Act comes from a federal tax collected by the "Highway Trust Fund" from a tax on the sale of gasoline in all states. These funds are quite substantial, amounting to $286.4 billion over the 6-year life of the legislation (2004-2009). An important function of the Act is to allocate funds to states for their use in

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

transportation investments and operations. Through the Act, Congress is able to influence the expenditure of these funds by the states and has directed that certain funds be used for ITS research, development and deployment purposes. This national focus has enabled the USA to exert a significant role in articulating and implementing ITS as an important element of surface transportation.

This basic law in the United States exists to govern and direct the spending of substantial funds available from the operation of the Highway Trust Fund. It is not clear from the limited information obtained through the *stage I* survey if the legislations or acts in the other 3 countries (Austria, Czech Republic, Korea) are also related to the allocation of funds for ITS.

6.2.3 ITS basic/master Plan? (13/21 or 62%)

Thirteen countries or 62% of respondents reported that they had an "ITS Basic Plan" or "ITS Master Plan" (Canada, China, Chinese Taipei, Czech Republic, Hong Kong China, Japan, Korea, Mexico, Norway, Slovakia, Sweden, Switzerland, USA). This is an essential tool for achieving harmony in the implementation of ITS across the surface transport sector. The three largest countries have an "ITS Basic Plan" (China, Japan, USA) and many mid-sized economies in Asia-Pacific (Canada, Chinese Taipei, Hong Kong, Korea, Mexico) and in Europe (Czech Republic, Norway, Slovakia, Sweden, Switzerland). It is noteworthy that none of the larger European countries (France, Germany, United Kingdom) reported the existence of an "ITS Basic Plan".

6.2.4 ITS plan council? (6/21 or 29%)

Six countries or economies reported that they have an "ITS Plan Council" (China, Chinese Taipei, Japan, Korea, Mexico, Switzerland). These six countries are located mostly in Asia-Pacific except for Switzerland that is in Europe. All 6 of these countries or economies reported that they have an "ITS Basic Plan " or "ITS Master Plan". It is reasonable to assume that their "ITS Plan Councils" are related to the implementation of their ITS Basic or Master Plans.

It is noteworthy that all of the countries or economies that reported they have "ITS Basic Plans" also reported, with one exception (China), that they have a national ITS organization. It is possible that the national ITS organization serve the same purpose as the ITS Plan Council but without dedicated budgets or assigned authorities. For example, in the case of the North American countries (Canada, USA), the national ITS organization are mechanisms for achieving community consensus on issues and for persuading the ITS community to adopt overall strategies and to implement action plans. It would be interesting to explore further if these are, in fact, two approaches and, if so, to assess the relative merits of each approach.

6.2.5 Regular report on ITS implementations? (6/21 or 29%)

Six countries or economies responded that they publish a regular report on ITS implementations (Canada, China, Chinese Taipei, Germany, Japan, USA). The utility of a regular report on ITS implementations is that it can be used to measure progress, for example, in the implementation of ITS plans.

It is noteworthy that the 3 largest countries that reported they have an "ITS Basic Plan" also reported they have regular ITS reports (China, Japan, USA). The scale of the ITS investments in each of these 3 countries is relatively large and they can therefore justify expending resources on regular reports for evaluation purposes.

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

6.2.6 ITS organizations (e.g. ITS America)? (18/21 or 86%)

National ITS organizations are present in almost every country responding to the *stage I* survey. National ITS organizations are organizations similar to ITS America. Only 3 countries (Austria, China, Peru) did not report the existence of a national ITS organization (although China reported an ITS Council that may accomplish the same purpose). The wide spread existence of these national ITS organizations confirms their usefulness, not only for serving national goals but also for facilitating international cooperation among national partners.

The ITS field is relatively new in the transportation sector and includes participants from the traditional civil engineering discipline as well as new emerging fields such as electronics and telecommunications. In this emerging arena of new ideas and technologies, it is important to seek consensus among the different players and their points of view. The national ITS organizations provide such a mechanism to foster cooperation and collaboration among public, private and academic sectors.

It must be noted that in the case of Europe, the ERTICO trans-national ITS organization serves a similar purpose to the national ITS organizations in individual countries. The existence of this regional ITS organization and its successful operation confirms the value of cooperation among players in the ITS field. Although not the subject of this survey, it is noted that their exist a number of regional ITS organizations to facilitate trans-national cooperation including ITS Asia-Pacific and ITS Pan-America.

6.2.7 ITS standardization strategy: (7/21 or 33%)

Seven countries or economies reported that they have an ITS standardization strategy (China, Chinese Taipei, Czech Republic, Hungary, Korea, Mexico, Switzerland). This is a useful instrument to raise awareness of ITS standards, identify needs and opportunities, and focus national effort on high priority work items and to direct resources, where these are made available. Five of these 7 countries are members of APEC. Their ITS standardization strategies indicate they have a strong commitment to ITS standards.

6.2.8 ISO/TC 204 domestic committee: (16/21 or 76%)

All countries that responded to the *stage I* survey, except the minor economies (Chinese Taipei, Hong Kong, Peru, Singapore) and one other (Mexico), reported that they have a domestic committee to support their participation in ISO Technical Committee 204. ISO is sponsored and supported by the national standards organizations of most countries and it is normal that there is a “mirror” committee for TC 204 in each country surveyed. The active promotion of ISO within the countries and economies of APEC has attracted a number of countries in Asia-Pacific to join ISO/TC 204.

The ISO/TC 204 domestic committees are the starting point for countries to participate in international standards development work. However, they are not effective for promoting adoption of ITS standards and there needs to be other complimentary activities to accomplish wide spread adoption. These activities could be implemented with support from the national ITS organizations. Ensuring that the broader environment for ITS development supports ITS standards is also essential.

6.2.9 Regular ITS standards report: 20% (5/21 or 24%)

Regular reporting on progress to develop ITS standards is one way to attract greater attention to the availability of ITS standards and to promote greater their greater adoption and use. However, only 5 countries that responded to the *stage I* survey reported that they publish a regular report on ITS standards. These include the 3 largest countries (China, Japan, USA) that have large economies and the greatest investments (or potential investments) in ITS. Two other countries (Czech Republic, Hungary) reported they publish a regular report on ITS standards so the size of the country is not an impediment. However, the availability of resources for this activity is no doubt a problem. This will only be rectified when senior decision makers agree to put more resources into ITS standards development.

6.2.10 Summary

This section has explored the environment in which national ITS standardization takes place. The two dimensions that were assessed in the *stage I* survey are the general institutional measures used to promote and guide ITS development in the country or economy and the measures use that are specific to ITS standards development and adoption. A particular interest of the APEC and Korea sponsored WRITSS project

Documents
Document Sharing Hub

© ISO 2008 – All rights reserved

Full document details: PD ISO/TR 28682:2008

is to establish if there are differences between the APEC countries and other regions of the world an, if so, what are these differences and can the APEC economies learn from the experience of other countries.

The results of the *stage I* survey for the ITS environment are presented in summary form in the table accompanying section 6.2. The 21 countries and their responses are presented in 2 groups of countries – APEC and Europe (CEN) – with one other country that belongs to neither group. The objective is to highlight any significant differences between these 2 groups of countries. The focus on Europe (CEN) countries is because it is a coherent "block" of countries, mainly in the E.U. or in Europe, with a long tradition of cooperation in standards development including ITS standards development. While not telling the whole story, a number of observations can be derived from the table.

A summary of the responses received from the countries in the *stage I* survey is shown in the following table. It highlights similarities/differences between APEC and Europe (CEN) countries/economies.

Table 9 Different environment in ITS standards development

No	Economy	APEC	CEN	ISO TC 204	ITS Law	ITS Plan	ITS Council	ITS Report (reg.)	ITS Org.	ITS Std. Strategy	ISO TC 204 Domestic Comm.	ITS Stds Report (reg.)
1	Australia	√		√-P					√		√	
2	Canada	√		√-P		√		√	√		√	
3	China	√		√-P		√	√	√	?	√	√	√
4	Hong Kong, China	√				√			√		N/A	
5	Japan	√		√-P		√	√	√	√		√	√
6	Korea	√		√-P	√	√	√		√	√	√	
7	Mexico	√				√	√		√	√	N/A	
8	Peru	√									N/A	
9	Singapore	√		√-O					√		N/A	
10	Taipei, Chinese	√				√	√	√	√	√	N/A	
11	USA	√		√-P	√	√		√	√		√	√
12	Austria		√	√-P	√						√	
13	Czech Rep.		√	√-P	√	√			√	√	√	√
14	Germany		√	√-P				√	√		√	
15	Hungary		√	√-P					√	√	√	√
16	Norway		√	√-P		√			√		√	
17	Slovakia		√	√-O		√			√		√	
18	Sweden		√	√-P		√			√		√	
19	Switzerland		√	√-P		√	√		√	√	√	
20	U.K.		√	√-P					√		√	
21	South Africa			√-P					√		√	
	Total	11	9	17	4	13	6	6	19	7	16	5
	- APEC	11	0	7	2	8	5	5	10	4	6	3
	- Europe(CEN)	0	9	9	2	5	1	1	8	3	9	2

Notes: The 21 responses to *stage I* survey are grouped into 11 APEC and 9 Europe (CEN) countries and 1 exception (South Africa). The first column indicates the country's alphabetic order among all 21 responses.

6.2.10.1 ITS development and deployment:

- Almost all countries in both the APEC and Europe (CEN) groups reported they have an ITS plan; these are important building blocks to guide the development and deployment of ITS within a country and economy;
- Almost all countries in both the APEC and Europe (CEN) groups reported they have national ITS organizations; these are important as forums to discuss and resolve issues as the ITS plans are evolved and rolled out in practice;
- Almost all the countries in both APEC and Europe (CEN) are members of ISO/TC 204 with the exception of the "economies" in Asia that do not qualify to join ISO on their own or are too small to participate;

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

- APEC countries or economies (5 of 11) are more likely to have an ITS Plan Council while only one Europe (CEN) member reported they have an ITS Plan Council; this may indicate a different approach to ITS in Asia, at least, for guiding the roll-out of ITS in their countries;
- More APEC than Europe (CEN) countries (5 versus 1) reported they publish regular national ITS reports;

6.2.10.2 ITS standards development and adoption

- Almost all countries in both the APEC and Europe (CEN) groups reported that they are members of ISO/TC 204; this confirms their collective interest in working together on ITS standards development and also in helping to establish an agree international baseline for ITS standards;
- Only 7 of 21 countries reported they have ITS standards strategies and this sub-group is not closely associated with either the APEC or Europe (CEN) groups; this may indicate there is only limited attention paid to this aspect of standards planning;
- Only 5 of 21 countries reported they publish regular reports on ITS standards and this sub-group is not associated with the APEC or Europe (CEN) groups; this may also indicate a limited attention to measuring progress in ITS standards development at the national level;

6.2.10.3 Sub-groups of countries within APEC

- The 2 North American countries (Canada, USA) with similar economic and social conditions, reported identical responses to all questions except one (USA publishes a regular report on ITS standards); the fact that Mexico, part of the NAFTA trading block, has very different responses may be due to the very different economic and social conditions in that country that influence the approach taken to ITS and ITS standards;
- The responses from the 4 largest countries in APEC (China, Japan, Korea, USA) were also similar in most respects indicating that economies that can afford mature and comprehensive ITS and ITS standards activities arrive at similar conclusions;

6.2.10.4 Europe (CEN group of countries)

- The 27 Europe (CEN) countries share common responses in not having a basic ITS law (2 exceptions), not having ITS plan councils (1 exception), not having regular ITS reports (1 exception), not having national ITS standards strategies (3 exceptions), and only 2 countries reported having regular ITS standards reports; the similarity of the approaches by these countries may be due to the existence of regional institutions such as the E.U. Commission (for planning), ERTICO (for cooperating) and CEN (for standards development) whereby these institutions provide the mechanisms that APEC countries provide on their own.

6.3 Status of ITS standards development worldwide

6.3.1 General

The WRITSS project has documented 662 ITS standards and standards-related work items from around the world (see Annex A for list). These include standards classified as international (ISO, ISO/IEC, ITU-R), regional (CEN, ETSI, IEEE), and national (by country) that have been developed either by national standards development organizations (e.g. AFNOR in France) or by national agencies responsible for aspects of transportation safety and/or productivity (e.g. NPA in Korea). The list in Annex A includes information about the class of each standard or work item, the originator of the standard (i.e. SDO), the work item reference number and status indicator, and the title.

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

6.3.2 International Standards

There are 208 international standards in Annex A including 166 from ISO, 36 from ISO/IEC, and 6 from ITU-R (that include 2 general work categories rather than specific work items). The list includes work items at all stages of development – preliminary work items (PWI), new proposals (NP), committee drafts (CD), technical reports (TR), draft International Standards (DIS), final drafts (FDIS) and completed International Standards (IS).

The ISO Technical Committee 204 (TC 204) is the focal point in ISO for Intelligent Transportation System (ITS) standards. TC 204 has 131 work items in its work program and they are organized into 12 working groups that cover all vehicle and infrastructure related work areas. There are also important ITS related work items in TC 22/SC13 (Vehicles), TC 211 (GIS), and TC 122/104 JWG (Intermodal Freight?), and TC 104/SC4 (???).

The ISO/IEC work items are cooperative efforts that fall within the purview of the Joint Technical Committee (JTC) 31, working group 4. The most important part of this work relates to radio frequency identification (RFID) that is common to many ITS wireless communication functions.

The ITU-R work items fall under 2 areas – Working Party 6M and WP8A. The ITU is responsible for spectrum allocation globally and between regions.

6.3.3 Regional standards

There are 126 regional ITS standards in Annex A including 104 from CEN, 3 from ETSI, and 24 from IEEE.

The Conseil European de norme (CEN) is a Europe-based standards development organization that has a mandate for developing standards on behalf of the European community. All of the ITS related standards work is conducted in Technical Committee 278 (TC 278). This committee is structured into a number of working groups similar to ISO/TC 204. Many European ITS experts who contribute to CEN/TC 278 also contribute to ISO/TC 204 that achieves economies of effort and expertise..

The ETSI ITS standards relate to roadside units and on-board units for signal exchanges with particular reference to the European context.

The IEEE standards development organization has global recognition but its main audience for rail-related ITS standards is focused in the USA. For this reason, it is classed as a regional standards development organization. However, the IEEE work items related to rail transit makes it a unique contributor to the ITS standards development field.. Note that IEEE also plays a significant role in the development of national standards in the USA (see section 6.3.3).

6.3.4 National and other important standards

There are 326 ITS standards-related work items under development or completed intended for application within national jurisdictions, almost half of the global total. Many of these are formal standards, having been developed by accredited standards development organizations such as AFNOR in France, KATS in Korea, ASTM in USA. Other examples represent national efforts to define requirements and to identify and adapt existing standards from other sources to meet local needs. An example of this is the technical guidelines developed by Canada for road-weather information systems. The summary table in section 6.3.4 provides an overview of the number of national ITS standards work items under development.

6.3.5 ISO/TC 204 standards adopted by national standards bodies

With the strong cooperative relationship, the ISO/TC 204 and CEN TC 278 share common work items 58 standards (39 published and 19 under development) and this reaches about half of work items of ISO/TC 204 or CEN 278. As the majority of European countries automatically adopt CEN TC 278 standards, as described in section 6.1, it is estimated that many of the ISO/TC 204 – CEN TC 278 shared standards are widely recognized or used in European countries.

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

This Technical Report has identified 33 national standards are adopted from ISO/TC 204 standards and the number is somewhat disappointing. This indicates that the majority of the APEC economies do not adopt ISO/TC 204 standards as national standards yet. The exceptions are China, Japan and Korea. The result revisits the statements of 6.1.3: *One reason is that international standards do not always reflect the particular needs of a country and some adaptation is necessary. Also, there is not a mechanism similar to CEN for non-European countries to use to coordinate closely the joint development of the standards they use. Therefore, these countries should focus on the benefits of closer regional cooperation to develop ITS standards and look for ways to accomplish this.*

Table 10 List of national standards adopted from ISO/TC 204

No	Country	Types	Number	Title	SDO
1	Australia	National Std.	ISO 14817	Transport information and control systems - Requirements for an ITS/TICS central Data Registry and ITS/TICS Data Dictionaries	SA
2	China	National Std.	ISO TR 14813-1:1999	Transport information and control systems -- Reference model architecture(s) for theTICS sector -- Part 1: TICS fundamental services	ITSC
3	China	National Std.	IS 14817:2002	Transport information and control systems -- Requirements for an ITS/TICS central DataRegistry and ITS/TICS Data Dictionaries	ITSC
4	China	National Std.	IS 14819-1:2003	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) usingALERT-C	ITSC
5	China	National Std.	IS 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 (RDSTMC)	ITSC
6	China	National Std.	ISO TS 14819-3:2000	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 3: Location referencing for ALERT-C	ITSC
7	China	National Std.	IS 15622:2002	Transport information and control systems -- Adaptive Cruise Control Systems --Performance requirements and test procedures	ITSC
8	China	National Std.	ISO TS 14904:2002	Road transport and traffic telematics -- Electronic fee collection (EFC) -- Interfacespecification for clearing between operators	ITSC
9	Japan	National Std.	14813-5	Reference Model Architecture for the ITS Sector - Requirements for Architecture Description in ITS standards	JISC
10	Japan	National Std.	14813-6	Reference Model Architecture for the ITS Sector - Data Representation Using ASN.1	JISC
11	Japan	National TR	14812	Glossary of ITS terminologies	JISC
12	Japan	National Std.	15622	Adaptive Cruise Control Systems	JISC
13	Japan	National Std.	15623	Forward Vehicle Collision Warning System	JISC
14	Japan	National TR	14813-1	ITSReference Model Architecture for the ITS Sector - ITS Fundamental Services	JISC
15	Japan	National TR	14813-2	Reference Model Architecture for the ITS Sector - Core ITSS Reference Architecture	JISC
16	Korea	National Std.	KS X ISO 14813-6	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1	KATS
17	Korea	National Std.	KS X ISO 14815	Road transport and traffic telematics -- Automatic vehicle and equipment identification -- System specifications	KATS
18	Korea	National Std.	KS X ISO 14816	Road transport and traffic telematics -- Automatic vehicle and equipment identification -- Numbering and data structure	KATS
19	Korea	National Std.	KS X ISO 14817	Transport information and control systems -- Requirements for an ITS/TICS central Data Registry and ITS/TICS Data Dictionaries	KATS
20	Korea	National	KS X	Traffic and Traveller Information (TTI) -- TTI messages via traffic	KATS

Documents
Document Sharing Hub

© ISO 2008 – All rights reserved

Full document details: PD ISO/TR 28682:2008

No	Country	Types	Number	Title	SDO
		Std.	ISO 14819-1	message coding -- Part 1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C	
21	Korea	National Std.	KS X ISO 14819-2	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)	KATS
22	Korea	National Std.	KS X ISO 14819-3	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 3: Location referencing for ALERT-C	KATS
23	Korea	National Std.	KS X ISO 14827-1	Transport Information and control systems -- Data interfaces between centres for transport information and control systems -- Part 1: Message definition requirements	KATS
24	Korea	National Std.	KS X ISO 14827-2	Transport information and control systems -- Data interfaces between centres for transport information and control systems -- Part 2: DATEX-ASN	KATS
25	Korea	National Std.	KS X ISO 14904	Road transport and traffic telematics -- Electronic fee collection (EFC) -- Interface specification for clearing between operators	KATS
26	Korea	National Std.	KS X ISO 14907-1	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 1: Description of test procedures	KATS
27	Korea	National Std.	KS X ISO 15075	Transport information and control systems -- In-vehicle navigation systems -- Communications message set requirements	KATS
28	Korea	National Std.	KS X ISO 15622	Transport information and control systems -- Adaptive Cruise Control Systems -- Performance requirements and test procedures	KATS
29	Korea	National Std.	KS X ISO 15623	Transport information and control systems -- Forward vehicle collision warning systems -- Performance requirements and test procedures	KATS
30	Korea	National Std.	KS X ISO 17261	Intelligent transport systems - Automatic vehicle and equipment identification -- Intermodal good transport architecture and terminology	KATS
31	Korea	National Std.	KS X ISO 17262	Automatic vehicle and equipment identification -- Intermodal goods transport -- Numbering and data structures	KATS
32	Korea	National Std.	KS X ISO 17263	Automatic vehicle and equipment identification -- Intermodal goods transport -- System parameters	KATS
33	Korea	National Regulation	MOCT 2004-513	Technical Regulation for Basic Transport Information Exchange (ISO 14827-1, -2 compatible) (ISO 14827 based)	MOCT

6.3.6 Summary

The issue to consider is, if technology is scientific and therefore universal, why is technical ITS standards development being conducted at national, regional and international levels with apparent duplication of effort and cost? It raise the question: is there not one technical solution for each problem and therefore a need for only one standard and one standard development effort? The answer lies in a number of factors – national policy (pride, trade barriers?), language barriers, unique technological choices made in related areas (e.g. broadcasting policies), cost factors (especially travel costs), and other phenomena that influence standards decision making. Even with the finest effort put into developing an international standard, there is still a need to adapt it to local circumstances (e.g. climate, social attitudes). In the other direction, national and regional standards can be developed at lower costs than international standards (especially since distances are shorter and therefore travel costs are lower) and it is easier and quicker to develop them first at this level and then to transfer them to the international level.

The following table summarizes the 662 ITS standards identified by the *stage I* and *II* survey in the categories of international, regional and national.

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

Table 11 Survey summary: International and regional ITS standards

Class	SDOs	Published	Under Development	Total
International	ISO	60	106	166
	ISO/IEC JTC 1	14	22	36
	ITU-R	4	2	6
	Sub-Total	78	130	208
Regional	CEN	61 (TC 204:39)	43 (TC 204: 15)	104
	ETSI	3	-	3
	IEEE	20	1	21
	Sub-Total	84	44	128
Total		**162**	**174**	**336**

Table 12 Survey analysis: National standards and source materials

Economy	Published		Under development	Total
	National standard (no. adopted from ISO)	TR, TS, Guide, and Association standards		
Australia	3 (TC 204:1)			3
Canada		4	1	5
China	7 (TC 204:7)		40	47
Czech Republic		7	2	9
France	15	1	8	24
Hong Kong, China		1		1
Japan	5	30		35
Korea	28 (TC 204:17) (9 regulations included)	49	2	79
Mexico			1	1
Sweden	1			3
Taipei, Chinese	3 (TC 204:1)			8
USA	111			111
Total	**173 (TC 204:26)**	**99**	**54**	**326**

6.4 Conformance features of ITS standards

Among seventeen responses for the *stage II* survey, fourteen countries explained that there exists no conformance requirements; Australia, Brunei, Canada, China, Chinese Taipei, Hong Kong China, Japan, Peru, Singapore, South Africa, USA. The other three countries, Austria, France and Korea provided short brief of conformance requirements.

Austria described in the survey response that conformance activities are done in parts third party certification, but mostly, self-declaration is applied.

France described that there is certification process for the toll tags for fee collection. This process is operated by a private company on the basis of the European standards. Also, France mentioned that it has a certification process for LCR road equipments which is operated by administration

Korea described several certification requirements for different purposes. Korean Standards Association(KSA) is responsible for certification of the Korean national standard KS. ITS Korea is Also, ITS Korea takes the responsibility for the conformance tests on ITS technical regulations regulated by Ministry of Construction and Transportation (MOCT). There are some certification processes for telecommunications by Telecommunication Technology Association (TTA). Road Traffic Safety Authority (RTSA), a subsidiary organization under National Police Agency (NPA), is chartered to conformance procedures for Traffic control systems operated by NPA. Also, Korea Highway Corporation is conducting some certification activities for ETC for freeway and Freeway Management Systems.

AVA Documents
Document Sharing Hub

© ISO 2008 – All rights reserved

Full document details: PD ISO/TR 28682:2008

6.5 List of ITS standards applied

Question 1 of the *Stage II* survey asked if any ITS standards were used for project specification or ITS application deployment. If so, then a summary of those standards was requested. Of the respondents, nine Countries/Economies responded with 100 projects in which standards were used. In one a single project was reported while in other cases only a representative sample was reported. Annex B.2 provides a consolidated list of the ITS.

Of all projects reported, 75 % were characterized as High significance. High/Medium was 1%; Medium was 16%; Medium/Low was 4; Low was 3%. There was one blank.

Of all projects reported, 64% were categorized as public type; 22% were joint public/private; 12% were private.

In many cases, projects were allocated multiple subdomains and in some cases only to the domain level. Table y reports the number of projects (of the 100 reported) that make reference to a particular service domain at least once. The highest number of project references were made to service domain 7, transport-related electronic payment.

Table 13 ITS standards applied by category

Service domain	Number of project references
1. Traveller Information	21
2. Traffic management and operations	27
3. Vehicle	0
4. Freight transport	9
5. Public transport	5
6. Emergency	4
7. Transport-related electronic payment	41
8. Road transport-related personal safety	3
9. Weather and environmental conditions monitoring	6
10. Disaster response management and coordination	2
11. National security	1
All domains	2

6.6 Lessons learned

As a follow-on to Question 1 of the *stage II* survey, Question 2 asked respondents to complete a brief report on any insights gained where ITS standards were used for project specification or ITS application deployment. Table x presents a listing of the titles of the lessons learned and Annex C provides a compilation of the responses. Each lesson includes a context, the lesson(s) learned, and a contact for further information on the lesson.

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

Table 14 Summary of Lessons Learned

Economy (Lesson No.)	Lesson Title	Date Reported	Location
Australia (Lesson 1)	Requirement for a data registry for ITS Harmonization	2002 - 2005	Victoria and Australian Capital Territory, Australia
Australia (Lesson 2)	Requirement for interoperable transit ticketing cards	2003 - 2006	Western Australia, Queensland, Victoria and New South Wales, Australia
Australia (Lesson 3)	Electronic tolling relies on standardization	1997 - 2006	New South Wales, Australia
Canada (Lesson 4)	Use common tag with related ITS Services: Use ITS standards already adopted by related ITS systems to reduce time to implement new ITS services	2004-November (date of acceptance of project proposal)	Nova Scotia, Canada
Canada (Lesson 5)	Reward payment system to ensure data quality from automated ITS traffic recorder stations	2004-September	Alberta, Canada
Canada (Lesson 6)	ITS system integration on 98 B-Line BRT using “standardized” equipment ensures interoperability throughout the network	2000-present	British Columbia, Canada
Canada (Lesson 7)	Ontario "Advanced Traffic Management Systems" - Standards	2006 – 01 - 09 (submission date)	Ontario, Canada
Japan (Lesson 8)	International Standard has secured interoperability of UD communication systems, but need some additional specifications to meet national requirements	2003-10	Japan
Japan (Lesson 9)	DATEX ASN for road information Dissemination Systems	2002-04	Tochigi Prefecture, Japan
Korea (Lesson 10)	Speeding up the deployment of national "Electronic Toll Collection System" (ETC S) by using the standardized communication protocol * KS X 6915 IR DSRC for ITS applications ISO FDIS 15628 DSRC application layer	2004-02	Seoul Metropolitan Areas, Korea
Korea (Lesson 11)	Improving the effectiveness of public transport systems by using the "Standard Numbering System for Public Transit Stops" (SNSPTS) *ISO NP 17685 SNSPTS	2004-12	Seoul Metropolitan Areas, Korea
Korea (Lesson 12)	Improving the compatibility and interoperability of the public transit Information systems by using the technical regulation for the public transit information exchange	2005-08	Seoul Metropolitan Areas, Korea
Korea (Lesson 13)	Building the standard location referencing system for the effectiveness of exchanging traffic information among the various ITS centres	2005-10	Freeway, national and regional highway in Korea

© ISO 2008 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008

Korea (Lesson 14)	To facilitate use of ITS standards, the standards development organizations (SDO) should consider providing the contents 'How to use a standard' or 'How to certify a standard'.	2005-12	Korea
Korea (Lesson 15)	In ITS/telematics field, there has been increasing needs for more strategic approaches on how to cooperate among standards developers. ISO might consider providing guideline how to effectively cooperate to add value to existing liaison regime.	2005-12	Korea
Switzerland (Lesson 16)	MEDIA Project ("Management of Electronic Fee Collection DSRC Interoperability in Alpine Region"), (ISO and CEN DSRC standards suite)	2005-07	France/Switzerland/Italy/ Austria/Slovenia
United States (Lesson 17)	Recognize that interoperability is becoming an important issue in achieving the vision of a nationwide 511 system. *A national experience with the development and deployment of 511 Systems.*	September 2003	California, Kentucky, Ohio, USA
United States (Lesson 18)	Use public sector workshops to increase awareness of ITS standards. *Minnesota DOT's experiences with a public sector workshop on ITS standards.* (This lesson is collected separately from www.itslessons.its.dot.gov)	May 2000	Minnesota, USA
United States (Lesson 19)	Understand system standards and protocols to save time during the development of an "Advanced Traveller Information System" (ATIS). *Institutional lessons from a test of a wide-area network to communicate traffic conditions in the Seattle area.* (This lesson is collected from the www.itslessons.its.dot.gov)	October 1998	Washington, USA
United States (Lesson 20)	Include significant planning and development time in the overall project schedule to accommodate identifying and addressing the various compatibility issues, to integrate existing legacy system equipment across multiple agencies. *Orlando, Florida's experience with a Field Operational Test (FOT) on using a single smart card for transportation payments at facilities operated by multiple regional agencies.* (This lesson is collected from the www.itslessons.its.dot.gov)	December 2004	Florida, USA

© ISO 2008 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 28682:2008