

CEN/BT/WG 141
"Intermodal and interoperable transport - Telematics"

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UNINFO - Corso G. Ferraris 93 – I - 10128 TORINO
TP: +39 011 501027 – TF: +39 011 501837
E-mail: bertinet@uninfo.polito.it

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1. Title

“Intermodal and interoperable transport – telematics”¹

The title has been defined within CEN - Bureau Technique: some adjustments, following the undergone activities (June-October 2002) and taken agreements, are proposed and justified further on.

2. Scope of the CEN/BT WG 141

CEN/BT WG 141 has been set up by the CEN - Bureau Technique during its meeting held in Brussels on 6-7 May 2002 with the purpose of creating a Business Plan and defining the main standards requirements related to “Intermodal and interoperable transport – telematics”, on the basis of on-going work in different Technical Committees (TCs) and in the co-operation with the TCs.

Although initially the scope of WG141 was covering transport and mobility of travellers, the debate during the first meeting of BT WG 141 has led to the conclusions that both freight and passengers/people have to be developed. The work within this group has to associate all the relevant activities and stakeholders involved in this context. The WG 141 has not the aim of producing standards, but could propose possible allocation of the standardisation work.

3. Vision

This Business Plan has been developed by CEN BT WG 141 in response to a Commission Mandate (M283), which requests the European Standards bodies - CEN, CENELEC and ETSI - to develop a work programme for multimodal and interoperable transport, with regard both to the mobility of travellers and to freight transport. Resolution BT 7/2002 established a WG to perform this task. The report has been prepared during the period July-October 2002 and then submitted to public inquiry until March 2003.

The work program defines European standards and any relevant action needed to be developed or supplemented to ensure a multimodal and interoperable transport, guaranteeing the accessibility for all passengers to the different transport modes.

The *aim* of any standardisation activity in the concerned context would be related to:

- increase multimodality and interoperability in the European transport, through the help of modern technologies and telematics;
- improve the effectiveness and efficiency in mobility of people and in freight transport;
- enhance transport handling, reduce traffic jams and queues;
- improve environmental conditions, reduce environmental load by increasing use of public transport;
- increase the income for operating companies in the involved subjects;
- reduce the cost for society;
- improve overall safety in the whole transport and travel chain;
- improve accessibility and quality for all passengers.

In the vision for the planned work, there is also the aim of finding ways for actually improving the *accessibility* to different transport modes by developing standards that help resolving this issue. Investment in the accessibility of public transport systems provides substantial cost savings in other areas, notably the welfare system, which itself accounts for a high proportion of public expenditure. According to the Commission Mandate M 273, CEN, CENELEC and ETSI are requested to determine requirements for standardization in order to ensure accessibility for disabled and elderly people within the information society.

¹ Web site for references: <http://www.uninfo.polito.it/CEN-BT-WG141/default-English.htm>, Contacts by e-mail: uninfo@uninfo.polito.it

4. Definitions

Few basic definitions, officially stated², need first of all to be introduced.

1. A **mode of transport** is any of the following transport *means or methods*: rail, road, air, sea or inland waterways³; in a more general context, transport *means or methods* include human limbs – namely legs – and any eventual instrument or equipment of which a person can avail him/herself for his/her mobility (e.g.: bicycles, wheel-chairs...).
2. **Multimodal Transport** of freight is the “Carriage of goods by two or more modes of transport”⁴.
3. **Intermodal Transport** of freight is “The movement of goods in one and the same loading unit or road vehicle, which uses successively two or more modes of transport without handling the goods themselves in changing modes”.

An equivalent definition for Multimodal Transport of people or passengers⁵ has been not officially provided by the same international bodies [ECE, ECMT, UN, 2001]; anyway, it can be seen as the transport of people using any mean or method, including: any kind of vehicle, equipment and personal mobility itself - typically, on foot - whenever necessary for the modal exchange.

According to the official definitions, it seems more proper, when speaking about people, to use the “multimodal” attribute when referring to the “Transport and mobility of travellers by using two or more modes of transport”. The term “intermodal” fits thereafter more appropriately the freight transport, being stated by the ECE, ECMT and UN that it deals with goods somehow gathered in a storage box.

It follows the characterization of two main distinguished subjects:

1. *Multimodal transport and mobility of travellers;*
2. *Multimodal and/or intermodal freight transport and logistics.*

A journey, in particular, is composed of several elements which link together to form a *transport chain*. For the journey to be accessible, each element must be accessible, and so must the links between them. The design of interchange areas is therefore crucial in making the whole system accessible.

Other relevant definitions [ECE, ECMT, UN, 2001] follow hereafter.

- a. **Accompanied Combined Transport:** Transport of a complete road vehicle, accompanied by the driver, using another mode of transport (for example: ferry or train).
- b. **Combined Transport:** intermodal transport where the major part of the (European) journey is by rail, inland waterways or sea and any initial and/or final legs carried out by road are as short as possible.
- c. **Intermodal transport unit (ITU):** container, swap body or semi-trailer/goods road motor vehicle suitable for intermodal transport.
- d. **Loading Unit:** Container or swap body.
- e. **Logistics:** The process of designing and managing the supply chain in the wider sense.
The chain can extend from the delivery of supplies for manufacturing, through the management of materials at the plant, delivery to warehouses and distribution centres, sorting, handling, packaging and final distribution to point of consumption.
- f. **Rolling road:** Transport of complete road vehicles, using roll-on roll-off techniques, on trains comprising low-floor wagons throughout.
- g. **Swap Body:** A freight carrying unit optimised to road vehicle dimensions and fitted with handling devices for transfer between modes, usually road/rail.

² For points 2 and 3, definitions have been provided by the Economic Commission for Europe (ECE), the European Conference of Ministers of Transport (ECMT) and the United Nations (2001).

³ According to U.S. Department of Transportation, “Transportation Expression”, US DOT, 1996.

⁴ The term *freight* broadly covers, in this context: not-containerised and containerised goods, palletised goods and packages.

⁵ Including: drivers, pilots, navigators, people on foot or on a bicycle, etc.

Originally, such units were not capable of being stacked when full or top-lifted. But many units can now be stacked and top-lifted and the main feature distinguishing them from containers is that they are optimised to vehicle dimensions. Such units would need a UIC approval to be used on rail. Some swap bodies are equipped with folding legs on which the unit stands when not on the vehicle.

- h. **Terminal:** a place equipped for the transshipment and storage of ITUs.
- i. **TEU:** Twenty-foot Equivalent Unit. A standard unit based on an ISO container of 20 feet length (6.10 m), used as a statistical measure of traffic flows or capacities (*one standard 40' ISO Series 1 container equals 2 TEUs*).
- j. **Unit Load:** Palletised load or pre-packed unit with a footprint conforming to pallet dimensions and suitable for loading into an ITU.

A glossary of terms used related to Logistics has been prepared within CEN/TC320⁶. The above-mentioned glossary takes into account only definitions more universal than those provided by any standard body.

Moreover, the following specific definitions, rather related to multimodal transport of travellers, are used in this document:

- a. **Information systems:** any information system based on fixed or mobile telecommunication networks, using voice, written or visual messages or images, independently from the network support (internet, private or public access networks);
- b. **Ticketing systems:** any manual or automated ticketing system, also including those based on the use of telecommunication supports (by using voice, remote access to internet, written messages, etc.);
- c. **Assistive technology:** "Any product, instrument, equipment or technical system used by a disabled person, especially produced or generally available, preventing, compensating, relieving or neutralizing the impairment, disability or handicap" (ISO 9999);
- d. **"Design for All":** design intended as the intervention on environment, products and services with the aim that everybody, included the future generations - independently from the age, sex, capacities or cultural baggage - can enjoy participating in the building of our society; the idea is to make products and services usable by everybody. It serves two purposes at the same time: meeting the needs of consumers who have difficulty using some products, and meeting the needs of companies who want to expand their potential market.

A **universal design** or **inclusive design** must therefore be intended as a design which cater for the needs of all potential users; it must be remembered that *travellers* are people with different user needs in terms of hearing, vision, physical and physiological impaired.

Both for mobility of travellers and for freight transport, further definitions can or would be supplemented by the specific and existing Technical Committees and/or Working Groups, mentioned further on.

*According to the definitions mentioned above, to the scope of the WG 141 and to a proposal emerged within the WG itself, it would seem more appropriate to identify it as "Multimodal and interoperable transport – telematics" or "Telematics for multimodal and interoperable transport"*⁷.

⁶ CEN/TC 320, N 234, "Logistics - Glossary of terms", Draft n. 1, WI 0320017, CEN, April 2002.

⁷ Following a note within [WG 141 N. 28, S. Østergaard, Danish Technological Institute, DK].

5. Introduction

5.1 Integration of transport systems and telematics for pursuing multimodality

Transport systems and telematics definitely require - at this moment of the European history as well as in the forthcoming years - an *integrated approach*, as underlined both at the Commission level⁸ and by most of European countries. The modern design, development, management and control of transport systems have to take into account both the *inner integration of telematics and the seamless interchange of information, freight and passengers among the different modes of transport*.

From the *European standardisation* point of view, such a challenge cannot be reduced to an extension of road transport, which has been for many years the main field of CEN activities.

The deep integration between telematics and transport and among the different modes of transport with the help of telematics regards *travellers and freight transport*; sometimes travellers and freight transport operators can benefit from a common use of telematics systems; other times the approach is separated. Logistics itself, until now seen from a "soft" point of view – viz., mainly organisational and economic – has now to be perceived more related to telematics, freight transport and related infrastructures. This way, telematics and automation must involve logistics from the mechanical (equipment and handling systems) and civil engineering point of view, and not only of the management of the procedures.

Thereafter, the present Business Plan and related activities aim at a definition and analysis of requirements, functional aspects, available technical solutions in different application fields from a multimodal and intermodal point of view, involving all means of transport (road, railways, inland and maritime navigation, air transport) and the related interchange areas (freight villages with connected inland terminals, container terminals...).

After the clear identification of requirements, the needs for standardisation may be identified together with all the competent committees already involved; the document itself is intended to outline any possible need for the development of specific standards.

5.2 Relations between the Business Plan and following standardisation activities

The following *background* has been taken into account for the present Business Plan.

- a. The Resolution 7/2002 (BT N. 6550, May 2002);
- b. The abovementioned definitions (§ 4);
- c. The Terms of Reference [WG 141 N. 13] of the WG 141, approved in the second meeting (20.09.2002) of the CEN BT/WG 141 [WG 141 N. 14];
- d. The requests emerged at the "European standards in Intelligent Transport Systems open meeting", on the 24.05.2002 (Brussels, B) by CEN TC/278, which is concerned with telematics for road transport and traffic, to deal with multimodal transport;
- e. The existence of other TCs within CEN dealing with logistics (TC 320 "Transport – Logistics and services) and other modes of transport.

Thereafter the following scheme (Figure 1), outlining the relations among the Business Plan and following standardisation activities, is proposed.

⁸ Brussels, 12.9.2001, COM(2001) 370 final, WHITE PAPER, "European transport policy for 2010: time to decide".

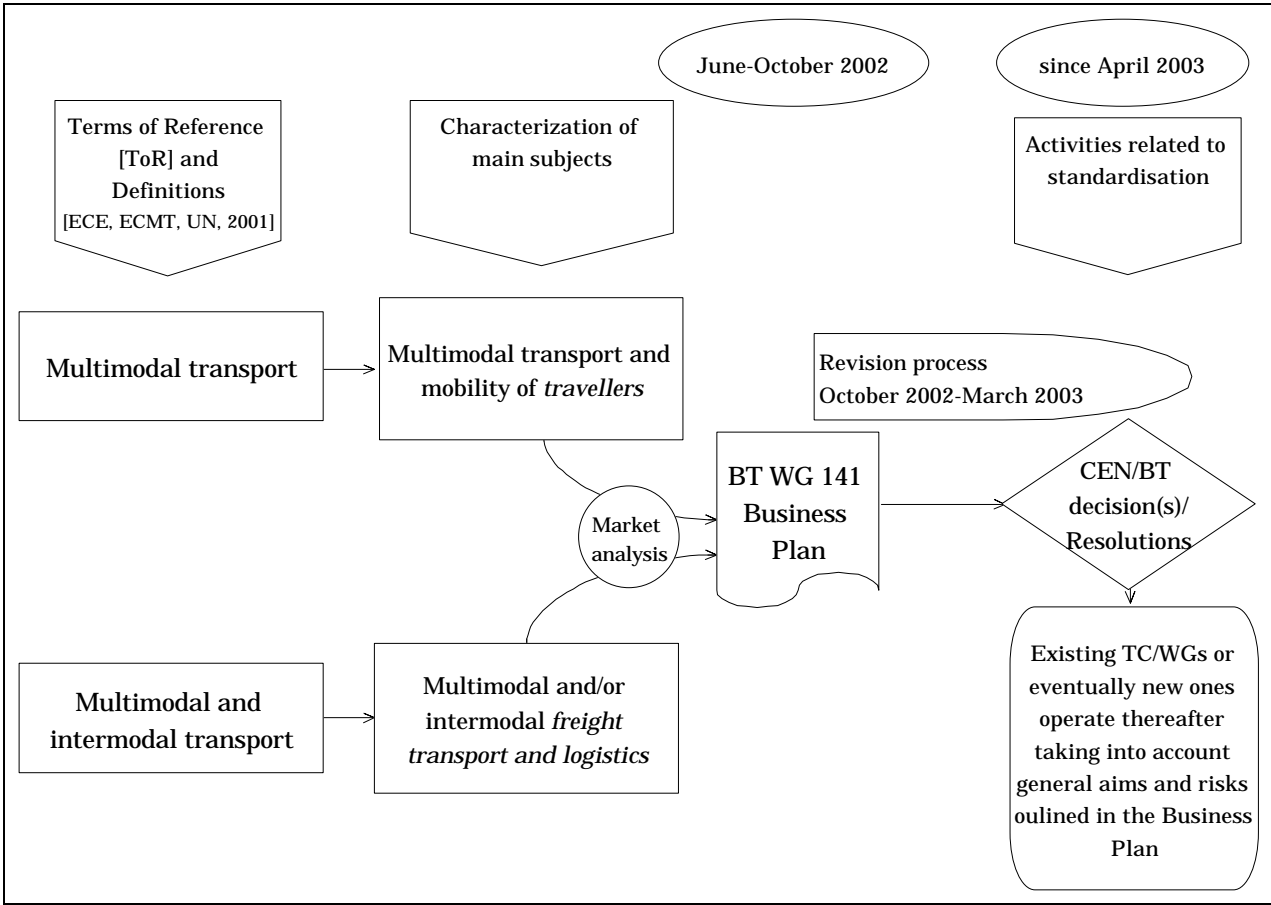


Figure 1. Relations between the Business Plan and subsequent standardisation activities

6. General context: market, user needs and standardisation activity

6.1 Scenario: demand and supply of ITS within the multimodal transport context

The *mobility of travellers* is up to any person, who:

1. take somehow the decision to move;
2. make a choice about the means of transport according to the knowledge he has of the transport services;
3. decide for a path, according again to the information he has about the alternative modes and traffic conditions.

The transport and handling of goods is instead decided and organised by a number of operators.

Then, involving the multimodal aspect, while people move by themselves - or anyway with an help by somebody else - and can get informed about their position by themselves within the interchange areas (railways stations, airports, ports...), freight needs somehow to be localised, moved and handled, together with a number of related documents.

The following main items are deduced.

- A. For a seamless multimodal transport and mobility of travellers, what is mainly needed is:
 1. *knowledge*, i.e. *information* (timetables, traffic, available spaces,...), in order to let people decide in the most appropriate way and – as far as possible, by themselves;
 2. *integrated payment systems*;
 3. *interoperable emergency transport services*⁹;
 4. *a supplement relating to accessibility, services, interaction, safety and risks*.
- B. For a seamless multimodal or intemodal freight transport, what is mainly needed is:
 1. *knowledge by the operators about the freight position, conditions and transport services*, i.e. *information* (timetables, traffic, available spaces,...)¹⁰,
 2. *automation in handling goods*,
 3. *integrated payment systems*,
 4. *interoperable emergency transport services*.

As far as telematics for *transport and mobility of travellers* are concerned (A), both the activities related to standardisation (namely within CEN/TC 278, ETSI, ISO/TC 204 and ISO/TC 211¹¹) and those concerned with the development of the European Architecture (KAREN/FRAME¹²) have dealt already a lot with the matter, sometimes even from the multimodal point of view. It does not matter whether, for example, the information on public transport service refers to a train or a bus, provided that the information is available. The need is rather that of having at disposal such information, and this is not a question of technical standards, but of agreements among data providers and, eventually, of a common multimodal ITS Architecture.

⁹ An *emergency* is intended here as any deviation from normal operation, including both interventions and services consequent the wounding of any being or from any accident, and a structural failure or severe environmental conditions that probably would cause harm to people or property.

¹⁰ The knowledge, by the operators, of such items, is mainly aimed at providing the client with them.

¹¹ ISO/TC 211 has embarked on location-based standards so as to bridge the geographic information integrated schema view into ITS with a vision to ensuring GI (Geographic Information) and ITS data are integrated. This is particularly needed for future disaster management applications, which will sometimes rely on turning raw earth observation data into advice to travellers.

¹² The aim of the FRAME projects (funded by the European Commission) is to encourage the implementation and enhancement of the European ITS Framework Architecture, <http://www.frame-online.net/>

Focusing more closely on the *transport and mobility of passengers*, a main goal of this report is to identify European ITS standards needed to ensure accessibility / mobility for all travellers within a multimodal context.

Public transport is, as the name implies, for the general public. The general public includes people with a wide range of abilities and limitations. A precondition for the widespread use of public transport is that it meets the range of abilities and limitations that the general public have. Accessibility to service facilities in society of today is taken for granted by all of us. Yet, poor design of equipment as well as improper structure of service cause major obstacles to many users¹³. The intent of the universal design concept is to simplify life for everyone by making products, communications and the built environment more usable by more people at little or no extra cost. Universal design has the possibility to increase the market and improve accessibility. Thereafter, user oriented standards, not technical oriented, are pursued. Standardisation activities must then deal with information, safety, physical accessibility, ticketing system, and evaluation, regulations for a multimodal and interoperable transport. Two perspectives must be taken into account:

- a. Of societal costs and use of special transport;
- b. Of individual human rights.

Standards can be used to support legislation by providing detailed technical specifications [WG 141 N57].

Focusing more closely on *freight transport and logistics* (B), a great number of subjects need to be faced and analysed, since there are quite evident reasons for recognizing in the integration of road, rail¹⁴, maritime, inland waterways the benefits arising from a standard approach in adopting telematics and common basic rules for a common design. As for air transport, a scarce traffic gravitates around this mode and it is mostly independent, from the logistics chain point of view, from the other modes; nevertheless, it is relevant from the economic point of view, mainly for the transport of parcels; therefore it must be taken into account within ITS [WG 141 N. 26].

All mentioned aspects mean that standardisation activity need to face:

1. All telematics and automated systems related to the modern criteria for designing and operating infrastructures for intermodal and, in particular, combined transport: intermodal terminals, container terminals, logistics centres (freight villages), related handling systems, innovative techniques for modal change, including those for the transport of complete road vehicles, using roll-on roll-off techniques (rolling road); the standardisation activity would even include telematics and automation for designing and projecting modern interoperable railways lines, including both the infrastructure aspects and the rolling stock, as well as the technological equipment of lines and trains.
2. Proposals for modelling and realise an integrated telematics system inclusive of different modes of transport: starting from the proposal for an ITS Architecture (independent from the standardisation process) suitable for the freight multimodal transport, the telematics features for a road and rail transport must be defined; then, the tracking of goods in a multimodal context should be pursued. On-line information for fleet management and scheduling of logistics activities is chased, as well as automated safety checking and monitoring while handling and moving freight.

All mentioned applications of telematics to multimodal and interoperable transport are based upon some main groups of telematic systems or technologies, which are substantially those to which standardisation activity is or should be addressed:

1. Fixed and mobile communication networks (TLC);
2. Automatic Vehicle Location Systems (AVLS),
3. Automatic Vehicle Identification (AVI) and Automatic Equipment Identification (AEI) systems;
4. Electronic Data Interchange (EDI) protocols and systems;
5. Cartographic databases and Geographic Information Systems (GIS);
6. Traffic monitoring systems and devices (image recognition, inductive loops, WIM devices...).

These telematic supports, integrated according to the different needs and features of different transport modes and services, may be applied to the latter in order to increase their efficiency and competitiveness, to reduce errors and

¹³ "Bringing Universal Design to the ICT-market- what are the prerequisites?", proceedings of the COST219 bis seminar, Stockholm, June 19, 2001

¹⁴ A significant effort to increase the railways transport in Europe is also foreseen and recommended by ERRAC 2020 (European Rail Research Advisory Council).

wasted time, and to better the quality of service (Figure 2). Framework architecture activities and contents are independent from those related to technical standards, but the first ones might generate the need for new standards.

Telecommunication networks are an indispensable element among such systems, and therefore the backbone on which the others, not always necessary in the various applications of telematics for transport, can be based.

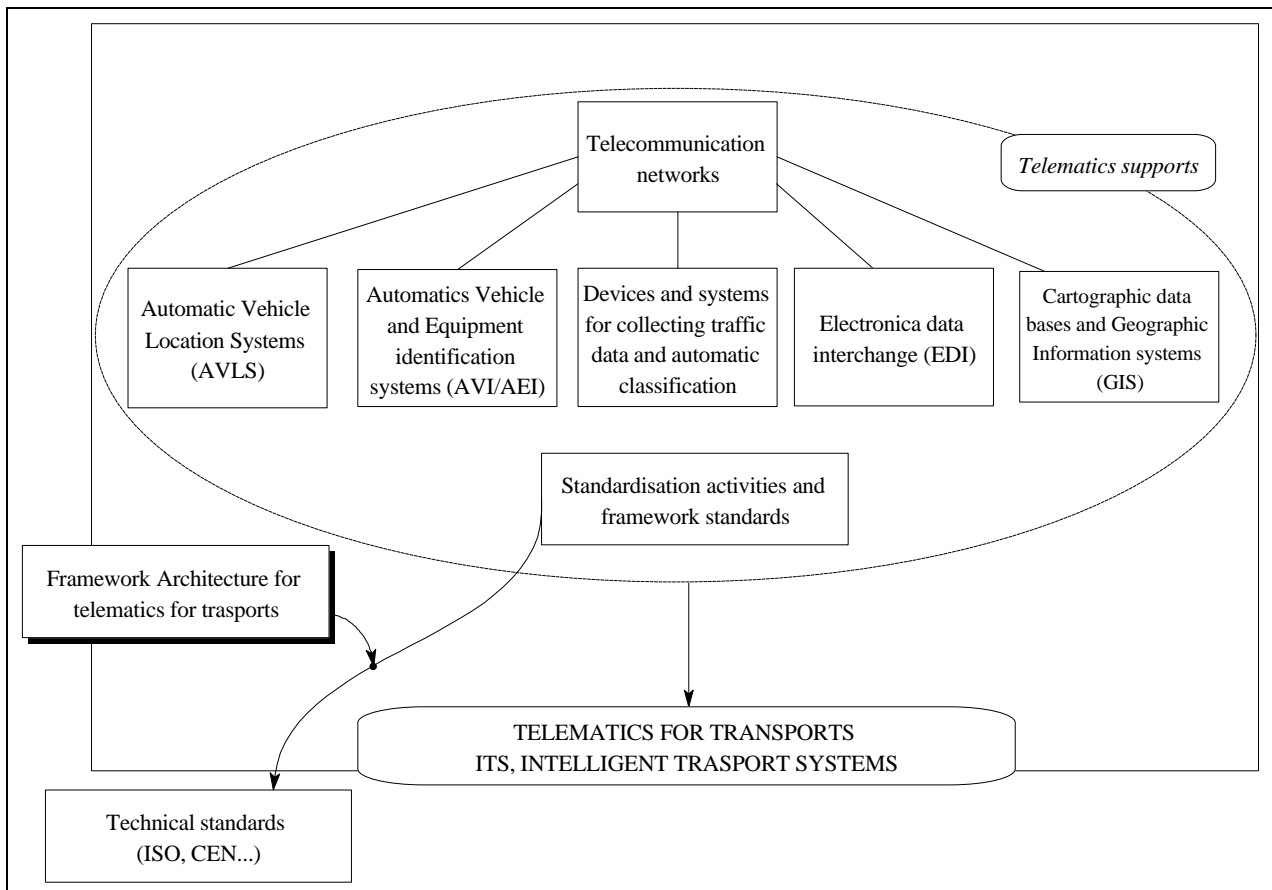


Figure 2. Integration of telematics supports: connection among the framework architecture and standardization activities

As for *telecommunication* networks, they can be summarised as:

- Fixed networks for public and private access;
- Radio-mobile networks for public access (GSM, GSM 1800, UMTS, etc.);
- Private Mobile Radio (PMR) and Public Access Mobile Radio (PAMR) networks, network services dedicated to road transport operators (DSRC, co-operative driving).

Automatic identification systems include:

- Radio frequency identification (Rfid);
- Barcode readers;
- Magnetic-strip cards;
- Smart cards;
- Identification by visual technology;
- Biometric systems.

Automatic location systems include:

- Inertial instruments;
- Proximity to accesses/ gates or to other devices of known location;
- Automatic location systems based on triangulation (on the earth, e.g. radio beacons, or with satellites);
- Automatic location systems based on cellular networks and, eventually, triangulation among base stations of the mobile network.

Principal *traffic data collection and automatic classification* devices and systems are:

- Inductive loops;
- Radar;
- Laser;
- Image detection systems;
- Microwave systems;
- Infrared systems;
- Acoustical systems;
- Piezoelectric systems.

Electronic data interchange (EDI) involves data exchange through standardised protocols, in particular EDIFACT (Electronic Data Interchange for Administration, Commerce and Transport), XML (Extensible Mark-up Language) and WML (Wireless Mark-up Language).

Cartographic databases and *Geographic Information Systems* (GIS) permit management and information procedures associated with the territory (digital maps) in a static or dynamic way, in particular those concerning the transport systems used on them.

Standardisation activities should proceed in relationship with *European Framework Architecture guidelines* for transport and traffic telematics, i.e. KAREN and the following FRAME European projects (ITS Architecture¹⁵). It is more and more a need that all this efforts lead to an integrated and interoperable transport system through different countries in Europe.

6.2 Users of multi modal transport

As regards multimodal transport and mobility of people or passengers, users can be namely recognised in *travellers*¹⁶. User needs of travellers should be defined taking into account needs of impaired people as a basis for standard requirements (Table 1).

Category of impairment	Description of the physical impairment and <i>related limiting conditions</i>
Reduced Vision Vision impaired	Poor sight – limited sharpness in vision/area of vision/orientation Blind <i>Lighting conditions, contrasts, glare, standardisation location, logical architectural solution, design, obstacles in the road/hazards. "Leading line", tactile surface, signs, staircase leading line, glass markers, sounds.</i>
Reduced Hearing Hard of hearing	Reduced hearing, hard of hearing Deaf <i>Background noise, acoustics, hearing aid, read lips- good lightning condition, visual</i>

¹⁵ In Europe: Finland with "Telemark" architecture, France with "Actif", Italy with "Artist", which includes the Multimodal Transport aspects (presented in Rome, 11.03.2003).

¹⁶ No matter if they can move by themselves or with supplementary devices; users having hearing, vision, physical and psychological capabilities compromised are included.

	<i>signs, information, minimum of noise, "inductive coupling", sound insulation, loudspeaker quality, "induction coil in handset", optical warning system</i>
Reduced Movement (Mobility impaired)	Walking problems Reduced sensitivity in hands and arms Wheelchair users (Reduced sensitivity) (Heart and lung disease) <i>Functionality, space, broad passage, remove obstacles, stairs plus ramp /elevator, short walking distance, easy to open doors, no twisting, flat areas of movement avoid steps, slide-safe, toilet.</i>
Environmentally challenged Allergic	Allergic asthmatic, eczema, Asthmatic <i>Right building materials, regulation of inner climate, cleaning, plants with low pollen, ventilation, smoke free, avoid humidity, limited areas for animals, food variations</i>
Psychologically/mentally cognitively challenged	Lower abstraction level, language difficulties, orientation <i>Written, symbol and picture, easy to grasp, separate different messages, leading line, recognisable areas, logical placing and functions and orientation</i>

Table 1. Travellers with reduced capabilities: category of impairment, description of the physical impairment and related limiting conditions

As regards multimodal *freight* transport, there are, first of all, two categories of users:

- 1) *Operators* (people);
- 2) *Transport systems* (objects, equipments, multimodal infrastructures and interchange areas).

As for the operators involved in the multimodal transport and logistics, they are synthesized and classified in Table 2 and Table 3.

As for transport systems, there is a general need for operating and managing transport systems in an innovative or enhanced way, e.g. deriving from requests of the European Commission or agreements within the United Nations. Main examples are:

1. Intermodal transport units equipped with AEI systems¹⁷;
2. Intermodal areas (e.g., container terminal) equipped with AVLS for the localisation of vehicles and handling systems, therefore even ITUs);
3. Longer trains for freight transport – constituted for example by 35 wagons/train modules¹⁸ - and rail tracks within intermodal terminals (700-750 meters) than most of those used all around Europe, implying both interventions on the infrastructures and on the rolling stock material and control; the ability to make longer trains is most likely related to the application of ITS systems (e.g. short range communication among wagons not equipped with any LAN or wiring at present);
4. Railway systems equipped with ATP/ATO/ATS¹⁹ for their interoperability.

As far as "transport systems" are concerned, the answer for their improvement is both related to:

- the development of the infrastructures (length of rail modules, tracks within the terminals,...) and of the rolling stock material
- the application of telematics and ITS.

¹⁷ European Commission, Directorate General for Energy and Transport – Directorate for Trans-European Networks Energy & Transport, "Intermodal Loading Units – Harmonisation and Standardisation initiative", Consultation paper, Brussels (B), 15.03.2002.

¹⁸ United Nations – Economic Commission for Europe, *European Agreement on important international combined transport lines and related installations* (AGTC), Geneva (CH), 1999.

¹⁹ Automatic Train Protection, Operation and Supervision.

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INFRASTRUCTURES (for road, rail, maritime and multimodal transport)	TRANSPORT	TRANSPORT AND LOGISTICS ORGANISATION
<i>Companies holding and/or running infrastructures</i>	<i>Companies operating in the different modes of transport and logistics for carrying and handling goods or for transporting people</i>	<i>Companies operating as organisers of the transport (mainly freight transport)</i>
Toll roads (including motorways, toll bridges, tunnels)	Road and intermodal transport companies	Forwarders, MTO (multimodal transport operators)
Public access roads	Road and intermodal transport companies	Forwarders, MTO
Railway infrastructure (National companies running railway infrastructures: SNCF, SBB, DB, RFI...)	Railways operators, ERRI (European Rail Research Institute) (http://www.erri.nl/), UIC (Union International des Chemins de Fer),...	Forwarders, MTO
Maritime Port Authorities, Maritime Terminal operators	Maritime transport operators, IMO (International Maritime Organization, http://www.imo.org/home.asp)	(Maritime) forwarders, MTO
Ports and terminals on inland waterways	Inland waterways operators	Forwarders, MTO
Logistics centres / freight villages (UK) / "Plateforme logistiques" (F) / GVZ (D) / "Interporti" (I) / "Centrales Integrales de Mercancia" (E) / "Transport centers" (DK), and inland terminals for ITUs (container and rail-road terminals)	MTO Europlatforms, EEIG - The European Association of freight villages (www.freight-village.com) European Intermodal Association (http://www.eia-ngo.com/), EUTP – Interactive Transfer point (http://www.eutp.org/), UIRR/IURR - International Union of combined Rail-Road transport companies (http://www.uirr.com/)	Forwarders, MTO
Airports and air transport platforms	ICAO –International Civil Aviation Organization (http://www.icao.int/), IATA	Forwarders, MTO, Express couriers

Table 2. Operators involved in the multimodal transport and logistics

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UNINFO - Corso G. Ferraris 93 – I - 10128 TORINO
 TP: +39 011 501027 – TF: +39 011 501837
 E-mail: bertinet@uninfo.polito.it

INFRASTRUCTURES (for road, rail, maritime and multimodal transport)	TRANSPORT	TRANSPORT ORGANISATION
<i>Companies holding and/or running infrastructures</i>	<i>Companies operating in the different modes of transport for travellers</i>	<i>Companies operating as organisers of the transport</i>
Toll roads (including motorways, toll bridges, tunnels)	Road and multimodal transport companies (transport of passengers)	Travel agencies, tour operators
Public access roads	Road and multimodal transport companies (transport of passengers)	Travel agencies, tour operators
Railway infrastructure (National companies running railway infrastructures: SNCF, SBB, DB, RFI...)	Railway operators, ERRI (European Rail Research Institute) (http://www.erri.nl/), UIC (<i>Union International des Chemins de Fer</i>),...	Travel agencies, tour operators
Maritime Port Authorities, Maritime Terminal operators	Maritime transport operators, IMO (International Maritime Organization, http://www.imo.org/home.asp)	(Maritime) Cruise operators
Ports and terminals on <i>inland waterways</i>	Inland waterways operators	(Inland waterways) Cruise operators
<i>Interchange</i> areas (including parking areas)	European Intermodal Association (http://www.eia-ngo.com/), EUTP – Interactive Transfer point (http://www.eutp.org/),	Town administrations, Public transport administrations...
Airports and <i>air transport</i> platforms	ICAO –International Civil Aviation Organization (http://www.icao.int/), IATA - International Air Transport Association (http://www.iata.org/search.htm)	Airport operators

Table 3. Operators involved in the multimodal transport and mobility of travellers

6.3 Market analysis

According to what emerged in the previous paragraphs, a *market analysis* has been carried out (July –October 2002), aimed at defining actual user needs and the relevant functions requested to ITS. The peculiar needs of freight transport market in comparison with the travellers' one justify a specific - but not exclusive - attention to the first one. As regards the travellers, ANEC has produced some documents [WG1412 N55, N57] in which the main needs, especially referred to impaired people, are outlined.

The results concerning multimodal and intermodal freight transport are briefly synthesised hereafter.

- A. *Rail-road combined transport* includes all shipments where the major part of the (European) journey is carried out by rail; any initial and/or final deliveries - as short as possible - from or to a terminal, are carried out by road. The market is dominated by national rail-road combined transport companies²⁰, typically one for each country, operating as main actors at the European level; nearly all these companies are associated, at European level, to UIRR²¹ association. From the standardisation point of view, their opinion, normally given through the mentioned European association, is quite important for all themes concerning swap bodies and related ITS applications (e.g., EC, Intermodal Transport Units, consultation paper, March 2002 and following "UIRR Position Paper"²²). At national level, some more or less important private companies exist (e.g. Ambrogio in I, Connects in F,...), operating their own terminals, fleets and wagons. Following some European projects - namely Cesar I and II²³ - the German, Italian and Swiss operators, afterwards joined by the French one, have developed a common system for: managing the booking of storage of loading units on wagons, managing the irregularities (delays, interruptions, miscarriages, etc.) in shipments, tracking and tracing loading units (including shipments), providing a unique and standardised information to the clients.
- B. The *Intermodal transport and Transshipment of Containers* includes all operations concerning the handling, transshipment and transport of containers, therefore of that intermodal transport where usually the main part of the journey is carried out on the sea or on inland waterways, while the minor paths are assigned to railways or to road transport. This kind of transport is usually carried out by using containers compliant with ISO standards. Actors in this context are quite different, given a high specialisation requested during each phase of the transport and logistics chain: principals / chargers, road haulage operators, railway operators, maritime operators, forwarders, shippers, m.t.o. (multimodal transport operators), custom Agencies, custom operators, port authorities, terminal operators, inland terminal operators, safety agencies, parking areas and storage areas operators, receivers. Given the variety and heterogeneity of involved actors, the need for the creation of a system - with related telematic services, having the role of aggregating common functions, provide statistical data, allow the EDI, with common interfaces and resources (data exchange and standard protocols) – has arisen all over Europe. Such a system is frequently recognised as CCS (*Community Cargo System*). Given the strict relation of many of the mentioned actors with the maritime transport, some harbours have carried out their own CCS. It is not clear neither well established the nature and the role of the actor or actors who have to carry out the development and management of a CCS at an higher level than that of the single harbour. Standardisation activity could then play a role in this context.
- C. The transport and logistics operations and related actors concerned with *Logistics centres* include all activities carried out in the "Freight villages" (UK), "Güterverkehrszentrum" or GVZ (D), "Interporti" (I), "Plates-formes logistiques" (F), "Centros de transporte or Centrales Integrales de Mercancia / CIM" (E), "Transport center" (DK). The main actors are associated in an EEIG (Europe Economic Interest Group) named "Europlatforms" (regl. n.2137/85, Council of European Commission); fifty companies are associated to this Association, all running logistics centres all over Europe. The main telematics applications in this context find place in some

²⁰ E.g.: CEMAT (Milano, I), Comiberia (Madrid, E), CTL (Londra, UK), Hupac Intermodal (Chiasso, CH), Kombiverkehr (Francoforte, D), Novatrans (Parigi, F), Ökombi (Vienna, A), Kombi Dan (Padborg, DK), Trailstar (Rotterdam, NL), TRW (Bruxelles, B),...

²¹ UIRR, *International Union of Combined Road-Rail Transport Companies*, <http://www.uirr.com>.

²² Refer to "10, Main basic bibliography".

²³ CESAR: "Co-operative European System for Advanced Information Redistribution" among rail-road transport operators and their clients (<http://www.cesar-online.com/>).

freight villages in the north-east of Italy²⁴, where ITS have been mainly applied for access control, for the management of the territory, for exchanging information on intermodal services (e.g., available trains and ships) with related terminals. Standardisation activity could then play a role in this context.

- D. The *Bulk Freight and Packages Transport* include all activities related to the transport, handling and related logistics operations of freight not charged on or within intermodal transport units or loading units (containers, swap bodies, semi-trailers); this kind of multimodal transport deals therefore with any good of any nature (coal, semi-manufactured, gravel, oversize transports, vehicles, pallets,...) moved and transhipped or transferred from one mode to another by the use of any equipment or means (transtainers, front-fork lifts, cranes equipped with grabs, tipping techniques, roll-on roll-off...) but not with spreaders or special pincers which can be used when handling ITUs; this kind of transport include: urban distribution of goods (as far as it is connected to the railways context or anyway the multimodal context), transport with oversize vehicles, the shipment of packages by railways, the generic transport of goods loose or unbound. These kinds of transport are executed through wagons loaded on their side or through with hopper ore cars, lorries, VANs, lorries for carrying cars, barges or various kind of ships; the tendency of the last decades shows the reduction of this kind of transport by adopting ITUs compliant with ISO or CEN standard sizes, wherever it is possible. The main actors involved in this context are quite numerous, given the peculiarity and the specialisation of functions requested in each phase of the transport and logistics chain: chargers or principals, road haulage carriers, stocking and distribution companies, railways companies, maritime and inland waterways transport operators, forwarders, custom forwarders, m.t.o., agents, customs, port authorities, terminal operators, intermodal terminals, bodies responsible for safety, parking area and depots, receivers.
- Given the fact that these operations are related to a multimodal context, with consequent operations and transfer of document, the forwarders and the couriers operating in such a context are the main actors to keep into account. Telematics in this context are spread in quite a disparate way: there is a general need for uniform adoption of bar-code standards or, at least, an address on their most suitable use. There is even a need for the adoption of AVLS, GIS and EDI applications. It seems that, in this context, a lot of standardisation activity has already been carried out; in some cases, the outputs, mainly as for what concerns bar codes, are not always so clear to the market.
- E. The transport and logistics operations and related actors concerned with *Inland Terminals for rail-road combined transport* include all activities carried out in such multimodal infrastructures: they must not be confused with container terminals, which have to be associated only with the logistics cycle of containers, then typically allocated in the ports. Within the inland terminals, swap bodies, semi trailers and terrestrial containers are usually handled. The main actors involved in this context are usually the same who manage the rail-road combined transport: companies associated to UIRR, both private and public, or even companies related to the management and or operation of railway transport, especially in those European countries where the liberalization of the railways sector has already occurred. The need for telematic systems in this field is mainly related to:
- the possibility of tracking and tracing the loading units (swap bodies and semi-trailers, in this case) both when handling them with transtainers/cranes/fork lifts within the terminals and when transporting them on rail wagons; such a need is particularly felt when dealing with frozen goods or freight with controlled temperature (some applications are already undergone) or with dangerous goods;
 - the development of a common European systems for managing the booking, the confirmation, the data exchange, the entrance of lorries and associated cargoes at the gates of the terminals, etc. related to operations of rail-road combined transport, both accompanied (rolling highways) and not;
 - the possibility of identifying automatically a train, maybe with a standard European AVI.
- F. The transport and logistics operations and related actors concerned with *Container Terminals* include all activities carried out in such multimodal infrastructures, where containers – but not their contents - are handled. The main actors involved in this context are quite numerous – like in the container logistics cycle, given the specialization requested: principals / chargers, road haulage operators, railway operators, maritime operators, forwarders, shippers, m.t.o. (multimodal transport operators), custom Agencies, custom operators, port authorities, terminal operators, inland terminal operators, safety agencies, parking areas and storage areas operators, receivers. Still, dealing with the infrastructure itself, i.e. the terminal, namely the actors gravitating around the terminal should be considered as strictly involved, though with continuous relationships and data

²⁴ Notably, those of Bologna, Verona, Padova, www.interporto.com.

exchange with those managing the shipping or transporting the ITUs. There is a number of telematic systems applied, both for identifying and locating ITUs within the terminal, and for managing the areas, including the stocking parks and the quays. There is a need for managing in advance, with the help of ITS, the arrival of tracks and containers at the road gates, in order to reduce the time of services, prepare documents in advance, informing clients, etc.

G. *Shipments of Dangerous Goods* represents a special kind of transport including all necessary operations for the depot, charge, handling, and moving of these categories of goods. At an international level, a committee of experts charged by the Economic and Social Council of the United Nations, draws up periodically some recommendations related to the transport of dangerous goods, to be applied to all transport modes. Such recommendations are thereafter accepted within the various international rules according to the following scheme:

- ADR²⁵, for the road transport;
- RID²⁶, for the railway transport;
- IMDG²⁷ code, managed by IMO²⁸ for maritime transport;
- Annex 18 (to the Chicago Convention of ICAO²⁹) or Annex A (to the resolutions 618 e 619 of the IATA³⁰ Council), for the air transport.

The main actors involved in this context are the companies specifically authorised for the transport of dangerous goods, in particular, in a multimodal context, forwarders ad m.t.o. The need for telematics applications in this context³¹ is quite felt when speaking about the public interest, the social implications and the policy control needs. Telematics would involve the planning of the trip, the tracking and tracing of the goods - including their temperature, pressure...- the control of the authorised paths, the automatic alarm and the rapid intervention in case of accident, the safety management.

H. *The Delivery of Parcels by Couriers* represents a special shipment including all operations related to the transport of envelopes, packages or parcels having the peculiarity of the rapid consignment (express); thereafter it is related to a multimodal transport carried out by a single company of couriers. The structure of the logistics chain of this kind of shipments respects, as a rule, that of a private organisation, being the company running such a transport equipped with own vehicles, in order to organise all the picking and delivery in an autonomous way, with the aim of providing a rapid and reliable service. The main actors of this context are express couriers and chargers. Telematics are generally well applied in this context and it seems that there are no particular needs for standards of systems, but instead of application of existing ones, especially PMR/PAMR ETSI standards. There would be the need for an ITS common standard or approach if, with the liberalisation of the railways market, couriers became involved in rail transport operations, so to become related to other transport companies.

Still, the marketing trend is towards separation of service facilitator roles from the execution of the service. It can be envisaged that, as a start, courier companies would recognize the wisdom of developing 'courier villages' at major airports where they would subcontract the final vehicular delivery step to the lowest acceptable bidder (subcontracting already occurs between major and minor carriers): further market research within the courier filed should be organized to assess their future requirements³².

In a general context, the following needs should be highlighted³³:

- the development of transport activities in the integrated Europe;
- the development of the European Infrastructure;
- the necessity of having interfaces for passengers, goods and data.

²⁵ *European Agreement concerning the international carriage of Dangerous goods by Road.*

²⁶ *Règlement International concernant le transport des marchandises Dangereuses par chemin de fer.*

²⁷ *International Marine Dangerous Goods.*

²⁸ *International Marine Organization.*

²⁹ *International Civil Air transport Organization.*

³⁰ *International Air Transport Association.*

³¹ [WG 141 N. 24, R. Maja, Polytechnic University of Milan, I].

³² [Martin Ford, ISLinkup, ISO TC/211, 24.10.2002].

³³ [R.D. Mann, Secretary CEN/TC 15, DIN (D)]

6.4 General user needs

As emerged in the previous paragraphs, the multimodal transport includes an high number of actors and users, of operations, services and it implies the necessity to communicate as well as to exchange data and information, as quickly as possible.

All this brings to the statement of a *whole of needs stated by stakeholders*, which a telematic systems/ITS should satisfy, in order to make informative processes automatic, as far as possible; such general needs can be mainly gathered as follows.

Transport and mobility of travellers³⁴

- Information on timetables, fares, rules in the different European countries, so in the different languages;
- Easy comprehension of messages before, within and after the interchange areas and capability of messages to attract the attention of travellers;
- Easily available interchange possibilities among the different transport services;
- Quality and relevance of the contents of the performed messages;
- Easy support in planning the multimodal trip;
- Availability of information along the trip with real time and immediate information about any delays, also in transport modes other than the one which is used at a certain moment;
- Possibility to change the itinerary along the trip with the telematic support;
- Voice and data communication possibility along the trip;
- Possibility to buy tickets and pay them during the trip, not matter which is the chosen mode;
- Availability of other services concerning events in the place one is going to visit;
- Provide location-based warning/instructions in case of emergency/ natural disaster etc.;
- Support for global server-side personal information management for travellers in the planning and execution, feedback /feed forward phase;
- Availability of additional modal steps such as a booking a taxi at the end of the public transport modal phases;
- Other user needs can be supplemented.

Freight transport

- Safety in the shipments and deliveries;
- Possibility to define date and hour for the consignment;
- Confidence on expected times of the consignments;
- Lack of errors during the different phases of the transport execution and the handling of goods;
- Reduction of delays, documents on paper, handling and transshipment times;
- Acceleration of physical flows together with the informative ones;
- Increase of the reliability in data exchange;
- Availability of instruments able to assure the privacy/protection of data and exchanges;
- Immediate access to information, in particular on the freight status, on its localisation and about the foreseen time of its consignment;
- Easy access to data bases for an optimal choice of services and related suppliers;
- Reduction of costs, following a more efficient management;
- Other user needs can be supplemented.

This listing of needs may find a sharper match within KAREN, ACTIF and - for intermodal transport - ARTIST list of user needs.

³⁴ Even taking into account "Consumers & intermodal transport Standards requirements", Adam Balfour, ANEC, 20 September 2002 [WG 141 N21].

6.5 Technical standards and standardisation activities related to Multimodal and Interoperable ITS

In order to identify areas of need for eventual new standards, existing relevant activities have been identified to ensure that:

- new standards will not overlap with existing ones;
- new standards will cover lacking areas/areas missing in existing standards.

The technical Committees within **CEN** mainly involved in the multimodal transport context are³⁵:

- CEN/TC 15, "Inland Navigation Vessels";
- CEN/TC 119, "Swap Bodies for combined goods transport";
- CEN/TC 147, "Cranes - Safety";
- CEN/TC 148, "Continuous handling equipment and systems - Safety";
- CEN/TC 149, "Power operated warehouse equipment / Rail-dependent storage and retrieval equipment - Safety";
- CEN/TC 150, "Industrial Trucks - Safety";
- CEN/TC 224, "Machine-readable cards, related device interfaces and operations";
- CEN/TC 225, "Bar coding";
- CEN/TC 256 "Railway applications";
- CEN/TC 274, "Aircraft ground support equipment port equipment";
- CEN/TC 278, "Road Transport and Traffic Telematics";
- CEN/TC 287, "Geographic information"³⁶;
- CEN/TC 300, "Sea going vessels and marine technology";
- CEN/TC 320, "Transport – Logistics and Services";
- CEN/TC 329, "Tourism Services";
- CEN/TC 331, "Postal services".

As CEN/TC 256 has not developed activities related to telematics applications, it would be better to refer to **CENELEC**³⁷ Technical Committee CLC/TC 9X "Electrical and electronic applications for railways" (applications dealing with electro technical standardization), which is developing standardization amongst others on ERTMS (European Rail Traffic Management System).

CEN BT/TWG 83 deals with "Transport of Dangerous goods", though without involving the ITS.

As concerns **ISO**, its TC204 "Transport information and control systems" has its own work programme in this area, and the Vienna Agreement arrangements ensure full synergies between the European work and that carried out at international level. ISO/TC22 "Road vehicles" is also relevant (<http://www.iso.org>)³⁹.

ISO/TC 8/SC 10 has produced the ISO/PAS 16917:2002-12-15 on "Ships and marine technology - Data transfer standard for maritime and intermodal transportation and security"⁴⁰.

A number of other Technical Committees in CEN and ISO may have work that is relevant to standardization in multimodal ITS. "Wherever possible, this other standards work needs to take account of specific requirements in relation to Intelligent Transport Systems, and, conversely, ITS-specific work should not seek to re-invent the wheel if the general standards solutions are adequate" [M 270, 2002].

³⁵ <http://www.cenorm.be/> and [WG 141 N. 28, suggestions by S. Østergaard, Danish Technological Institute, DK]; the CEN TC 304, "Information and Communication Technologies- European Localisation Requirements", though has a title which seems to be related to the subjects involved by this BP, is actually not consistent with them and is anyway not active.

³⁶ Although currently dormant, CEN/TC 287 is included as it provides the Vienna Agreement incentive link to ISO/TC 211.

³⁷ <http://www.cenelec.org/BASIS/celis/free/group/SDF>.

³⁸ M 270 WG, "European standardization in Intelligent Transport Systems - A proposed European Programme", Final draft for consideration by Open Meeting, OM Draft version 1.0, CMC/ISSS 25 March 2002.

³⁹ M 270 WG, "European standardization in Intelligent Transport Systems - A proposed European Programme", Final draft for consideration by Open Meeting, OM Draft version 1.0, CMC/ISSS 25 March 2002.

⁴⁰ [WG141 N56, provided by Rolf-Dieter Mann, DIN (D)].

Besides, the following ISO activities are quite relevant to multimodal and interoperable ITS:

- I. ISO Project Team 19133, TC211 Geographic Information - Location Based Services Tracking and Navigation, URL: www.islinkup.net/lbs/19133⁴¹;
- II. ISO Project Team 19132, TC211 Geographic Information - Location Based Services Possible Standards, URL: www.islinkup.net/lbs/19132⁴²;
- III. ISO Project Team 19134, TC211 Geographic Information - Multimodal Location Based Services for Routing and Navigation, URL: www.islinkup.net/lbs/19134⁴³;

ISO/TC 211 also provides a number of other probable normative references: the incentive to consider these is that TC 211 have built an integrated harmonized model of all their standards using UML. ISO/TC 204 have recently resolved to examine the harmonized model, the UML profile and rules adopted by TC 211 and the procedure to derive XML from UML⁴⁴.

Specific documents related to multimodal transport are:

- [1]. EN 13011, "Transportation services, Goods Transport Chains, System for declaration of performance conditions", CEN, October 2002
- [2]. prENV 14310, "Freight transportation services - Declaration and reporting of environmental performance in freight transport chains", Final Draft, CEN, November 2001
- [3]. prENV 13816, "Transportation - Logistics and services - Public passenger transport - Service quality definition, targeting and measurement", Final Draft, CEN, August 2001
- [4]. CEN TC 320, prEN WG7 N 08, "Transport Service — City Logistics — Requirements for the definition of limited access to city centers", Haupt-Element, January 2002
- [5]. CEN/TC 320, N 234, "Logistics - Glossary of terms", Draft n. 1, WI 0320017, CEN, April 2002. EDIFACT, afterwards XML, documents.
- [7]. CEN TC 278 WG 12 on AEI / AVI;
- [8]. ISO TC 204 New Work Item for a "Standard for a Data Dictionary and Message Set for Intermodal Freight"

Among the abovementioned TC of CEN, the most active ones in context somehow related to multimodal and interoperable transport are: CEN TC 278 and CEN TC 320.

CEN TC 278⁴⁵ is in particular divided into the following Working Groups:

- WG1, Electronic Fee Collection (it has not a particular interest in relation with this BP);
- WG 2, Freight and Fleet Management Systems (not active since a number of months);
- WG 3, Public transport (could have an impact on multimodal and interoperable ITS);
- WG 4, Traffic and Traveller Information (relevant);
- WG 5, Traffic Control Systems (it has not a particular interest in relation with this BP);
- WG 7, Geographic data file (relevant);
- WG 8, Road databases (it has not a particular interest in relation with this BP);
- WG 9, Dedicated Short Range Communications (it has not a particular interest in relation with this BP);
- WG 10, Human Machine Interfaces (could have an impact on multimodal and interoperable ITS);
- WG 11 (left out);
- WG 12, Automatic Vehicle and Equipment Identification (relevant);
- WG 13, Architecture (relevant, together with FRAME/KAREN European Architecture⁴⁶);

⁴¹ Password protected.

⁴² Password protected.

⁴³ Password protected.

⁴⁴ [Martin Ford, ISLinkup, ISO TC/211, 24.10.2002].

⁴⁵ <http://www.nni.nl/cen278/>.

⁴⁶ Note: "Architecture" and "Standardisation" are related but are quite independent processes. Architecture represents in fact a common approach or a basis for ITS development, based on: the User Needs, then the Functional viewpoint, the Physical viewpoint, the Communication viewpoint, according to KAREN, then FRAME principles (<http://www.frame-online.net/>). Architecture is independent from the technology. Standardisation needs may rise when applying architecture for the development or test of any particular ITS. Standardisation is of course related to specific technologies.

- WG 14, Recovery of Stolen Vehicles (it has not a particular interest in relation with this BP).

CEN TC 320 is in particular divided into the following Working Groups:

- WG 1, Transforming ISO9000 to transport (it has not a particular interest in relation with this BP);
- WG 2, Performance Criteria both EN13011 Declaration of Quality and CEN Report 14310 (could have an impact on multimodal and interoperable ITS);
- WG 3, Transport of Dangerous Goods (it has not a particular interest in relation with this BP);
- WG 4, Furniture Removals (it has not a particular interest in relation with this BP);
- WG 5, Public Transport (of Passengers) have produced EN13816 (with an impact on involved subject; even a new work item of modular shift could also influence this activity);
- WG 6, Logistics - Glossary of terms (relevant);
- WG 7, City Logistics (also related to ITS)
- WG 8, Freight Terminals (could have an influence, but has not particular proposals).

There is a number of **ETSI** standards which are significant and of possible use within multimodal and interoperable ITS: their need and consequent usefulness in the transport and logistics filed depends on the foreseen applications of them.

In the field of ITS, ETSI⁴⁷ standards are already widely used. These standards often do not address individual applications but are open to a wide range of them; only in few cases, specific work has been done.

ETSI maintains a long lasting liaison with CEN/TC 278 with a focus on Dedicated Short Range Communication (DSRC).

ETSI also participated in CEN/CLC/ETSI Joint Programming Committee Rail. ETSI's main contribution for the railways is a specific set of GSM-standards (GSM-R). GSM-R is used for high-speed railways in Europe but will also be applicable when the request for interoperability of conventional railways comes.

Co-operation with ISO/TC 204 has recently been started for their CALM project, which will use a wide range of different radio standards and/or mobile networks.

Not ITS-specific, but ITS-related are the ETSI standardization activities (often shared with CEN/ISSS) in eBusiness and eCommerce ([mobile commerce](#)) which involves as well IC-Cards and a range of security items.

As there is a general tendency that radio frequency spectrum cannot be reserved for specific applications, the use of more "general purpose" mobile networks becomes the preferred options. UMTS is the best-known example for this.

Independently from specific technologies, the Next Generation Networks ([NGN](#)) concept applies the strict separation between underlying network infrastructure and the value-added service provision. The Open Service Access ([OSA](#)) will provide the necessary Application Programming Interfaces (APIs) for the service provision. Similar principles will be followed for the terminal side.

Finally, Emergency Telecommunications ([EMTEL](#)) is an ETSI activity, which will cover the information flow between concerned emergency organisations and the citizens and the availability of the services in emergency situations. In this context, [MESA](#)⁴⁸ will provide the broadband mobile technologies with self-establishing/healing networks in a protected radio frequency spectrum⁴⁹.

6.6 Relevant activities related to standardisation in multimodal transport

Quite important activities related to multimodal and interoperable transport are carried on by:

- **UIC**, Union International des Chemin de Fer (http://www.uic.asso.fr/home/home_fr.html)

⁴⁷ [WG 141 N .31, G. Ochel, ETSI Secretariat]

⁴⁸ MESA stands for "Mobility for Emergency and Safety Applications", that is the "broadband mobile for public protection and disaster relief communication" (<http://www.projectmesa.org/>); the ETSI agreement with TIA was signed in the city of MESA, USA.

⁴⁹ [G. Ochel, ETSI Secretariat, 28.10.2002]

- **AEIF**, European Association for Railway Interoperability (<http://www.aeif.org/>)⁵⁰
- **IMO**, International Maritime Organisation (<http://www.imo.org/index.htm>)
- **ICAO**, International Civil Aviation Organization (<http://www.icao.int/>)
- **AECMA –STAN**, European Association of Aerospace Industries (<http://www.aecma.org/>).

A noteworthy activity is the one developed by CEN/ISSS/WS/eBES/EEG2⁵¹: European Expert Group on EDI and e-commerce in Transport. EEG2 has the primary mission to identify EDIFACT standard message requirements for the transfer of transport data and to develop and maintain United Nations Standard Messages (UNSM's) for transport and logistics purposes. EEG2 also deals with the relevant Codes lists including UN Recommendations. In the context of the new Internet technologies, D4 develops the transport Business Models, the transport Core Components and Business Information Entities, in accordance with the UML and UMM methodology, such as to develop standard XML⁵² documents for the transport and logistics sector⁵³.

As concerns inland navigation, the inland ECDIS "Electronic Chart and Display Information System" is a standard adopted by the Central Commission for the Rhine, the Danube Commission and the UN/ECE. The document is mainly an extension of the S57 and S52 Standards of the IHO (International Hydrographic Organization)⁵⁴

Besides, the following documents are quite relevant to the subject and should be taken into account for even eventual subsequent standardization activity.

1. CEN M270 results, "European standardization in Intelligent Transport Systems - A proposed European Programme, Status: Final - taking into account the views of the Open Meeting and approved by RTTSC by correspondence", European ITS standards Programme, Final version 3.0, CMC/ISSS 5, August 2002.
2. FRAME Project (FRAMEWORK ARCHITECTURE MADE FOR EUROPE), funded within the IST Programme (Information Society Technologies). 2001-2004, <http://www.frame-online.net>. CEN ISSS "Multimodal End to End Tracking and Tracing" Workshop (MEET).
4. EEIG ERTMS Users Group, "Users specification of the complete ERTMS (European Rail Traffic Management System)", <http://www.cordis.lu/transport/src/ertms.htm> and <http://www.ib.be/ertms/>, 2002.
5. ETCS Functional Requirements Specification (FRS), Version 4.0, Ref. UIC/A200/FRS.02-935614-4.00-960827.
6. FRAME-S (FRamework Architecture Made For Europe - Support), IST Programme (Information Society Technologies), Call Identifier "Continuous submission" (Accompanying Measure), Key action 1, Action Line: IST-2000-1.5.1, Contract number "IST-2000-29663", 2001-2004.
7. *Ministero delle Infrastrutture e dei Trasporti* (Italian Minister of Infrastructure and Transport), ARTIST, *Architettura Telematica Italiana per il Sistema dei Trasporti* (Italian Telematics Architecture for the Transport systems), *Architettura di Riferimento* (Reference Architecture), Unità operativa, Rif. D2, July 2002.
8. Interoperability and ERTMS/ETCS levels definition, version 6.EEIG ERTMS Users Group, 31/7/98, Ref. 96e013.
9. ERRI projects carried out for the European Commission with the participation of the UIC, in http://www.eri.nl/projects/_eu_projects.htm.
10. Commission of the European Communities, Communication from the Commission on integrating conventional rail systems, "Proposal for a directive of the European Parliament and of the Council on the interoperability of the trans-European conventional rail systems", Brussels, 25.11.1999, COM(1999) 617 final, 1999/0252 (COD).

⁵⁰ AEIF is the joint representative body mandated by the EU Commission to lay down the Technical Specifications for Interoperability (TSIs).

⁵¹ EEG2 is the European eBusiness transport Group and was founded in 1988 (as MD2 then); url: http://www.uic.asso.fr/o_best/eeg2_main.htm.

⁵² See even: <http://www.ebxml.org/>.

⁵³ [Strategy Manager, CEN/ISSS - Information Society Standardization System, 21.10.2002].

⁵⁴ Refer to www.ccr-zkr.org, Inland ECDIS Standard, [provided by Christian Krajewski, Wasser und Schifffahrtsdirektion Südwest, D]

In particular, from CEN M 270 the following Recommendation results⁵⁵.

“Multimodal Transport (Recommendation 1)

The group confirmed the need for consistent standards for multimodal aspects, even if this is not within the direct competence of TC278, standardisation work should be undertaken.

It emphasised the need to speed up the standards process (difficult in the case of multimodal transport, due to the need to involve all modes of transport) and called for more involvement of the stakeholders, including consumers, in the standardisation bodies.

The group stated that there was a need to clearly define multimodal transport versus intermodal transport. Multimodal would make reference to ~~freight~~⁵⁶ ~~passengers~~ *travellers* whereas intermodal would involve ~~passenger~~ *freight* transport. TC278 should provide the interface between multimodal and the rest modes of transport.

The main priority areas were Freight transport and the interface between road (freight) and rail.”

The following tables (Table 4, Table 5, Table 6) include existing and ongoing national and international standards, projects, programs, plans, reports on basic principles and guidelines related to *transport and mobility of travellers*, with particular reference to *impaired people* [provided by ANEC, February 2003].

Organisations	Standards- / programs	Content
ISO	ISO TC 204	Talking signs
CEN	CEN TC 224 WG 6	Card Reading Devices - Man Machine Interface EN 1332 Parts 1- 4 Part One: Dialogue design principles Part Two: Tactile Marking on Cards Part Three keyboards Part Four: Coding of User Requirements Technical Specification. Access to Card Reading devices
	CEN TC 224 WG 11	Machine Readable Cards – Surface Transport Application electronic ticketing
	CEN TC 278	12 Working groups in TC. Some cover Traveler information (Wg 4) and ticket machines (WG 3) from technical orientation – not user perspective. Little / no end user involvement in TC 278.
	TC 270	Check cennorm.be/irrr (evt gjennom bt278)
	Pr EN 13816	A “quality standard” but does not consider universal design.
	CEN Workshop	FASTEST - Facilitating Smart Card Technology for Electronic Ticketing and Seamless Travel”
	CEN Workshop	”Design for All”
	CEN/CENELEC Guide 6	Guideline for standard developers to address the needs for older persons and persons with disabilities.
ETSI	EN 12182	Technical aids for disabled persons - General requirements and test methods
	ETSI EG 202 067	Universal Communications Identifier (UCI); System framework
	ETSI ES 202 076	User Interfaces; Generic spoken command vocabulary for ICT devices and services.
	ETSI SR 001 996	An annotated bibliography of documents dealing with Human Factors and disability
	ETSI TR 102 068	Requirements for assistive technology devices in ICT
	ETSI EG 201 379	Framework for the development, evaluation and selection of graphical symbols
	ETSI ES 201 381	Telecommunications keypads and keyboards; Tactile identifiers

⁵⁵ A more extended recommendation, according to European ITS standards Programme (Final version 3.0 CMC/ISSS 5 August 2002), is reported in the Annex 11.1

⁵⁶ The deleted words are non compliant with the UN/ECE/CEMT official definitions, therefore they have been substituted with the correct ones (n.o.a.).

Organisations	Standards- / programs	Content
	ETSI ES 201 275	User control procedures in basic call, point-to-point connections, for Integrated Services Digital Network (ISDN) videotelephony
	ETSI EG 201 103	Human factors issues in Multimedia Information Retrieval Services (MIRS)
	ETSI EN 301 462	Symbols to identify telecommunications facilities for the deaf and hard of hearing people
	ETSI ES 201 125	Specification of the minimum Man-Machine Interface (MMI) for Phase 1 UPT
	ETSI EG 201 795	Issues concerning user identification in future telecommunications systems.
	ETSI TR 101 767	Symbols to identify telecommunications facilities for deaf and hard of hearing people
	ETSI EG 201 472	Usability evaluation for the design of telecommunication systems, services and terminals
	ETSI TR 102 083	Supplementary service codes for use in public network services
	ETSI ES 201 382	Procedure for registering a supplementary service code
	ETSI EN 301 104	Human factors requirements for a European Telephony Numbering Space (ETNS)
	ETSI EG 201 940	User identification solutions in converging networks
	ETSI TR 101 806	Guidelines for Telecommunication Relay Services for Text Telephones
	ETSI ES 201 930	Specification of user requirements for use in ETSI deliverables
	ETSI TR 102 068	Requirements for assistive technology devices in ICT
	ETSI EG 202 048	Guidelines on the multi-modality of icons, symbols and pictograms
	ETSI TR 102 105	Supplementary Services; A review of ETSI deliverables
	ETSI EG 202 116	Guidelines for ICT products and services; "Design for All"
	ETSI TR 102 077	Universal Communications Identifier (UCI); Maximizing the usability of UCI based systems
	ETSI EG 202 072	Universal Communications Identifier (UCI); Placing UCI in context; Review and analysis of existing identification schemes
	ETSI TR 102 125	Potential harmonized UI elements for mobile terminals and services
UK/European	Leading line.	Ongoing European cooperation for developing a common standard. Important with a common code independent of the city, country it is concerning. BSI has already developed own standard.
Sweden	Guidelines for bus stop standards and accessibility. "Vägverket"	Guidelines for improving bus/tram stops, train platforms and new platforms that will ensure accessibility for impaired.

Table 4. Existing standard concerning transport and mobility of travellers

Organisations	Projects	Content
	RTD projects	Many RTD projects, (European and national) that have considered aspects (high level and detailed) related to travellers needs and identify material of relevance for standardisation. (Roadmap would be of help). Ensure that future RTD projects provide targeted input to existing and planned standardisation bodies and activities. (Roadmap would be of help).EU – Info Soc.
Sweden	Flexi line in Gothenburg:	Transportation offers adjusted for elderly and impaired. "Door to door". The flexi line concept is implemented in many cities in Sweden. Good results according to improved offers for the target group.

Organisations	Projects	Content
Sweden	"Without obstacles – from door to door – concerning project "total travel chain":	The Swedish government has the aim of making public transport accessible for all people within year 2010. In connection with this work "Total travel chain" have been started as a co-operation between various Swedish organizations and private companies/public departments. The project will form the basis for work for accessibility in Sweden towards 2010.
Norway	"NOU 2001:22 "Fra bruker til borger":	A Government appointed group elucidated rights of the impaired in a broad sense, as well as suggesting strategies and means of pushing participation and equality of status for the impaired, in the Norwegian society. Focus area 1: Public transport. Aim 1: Within 2003 a national accessibility standard for all means of transport. (Plane, train, bus, boat/ferry) Means are thoroughly described. The report has not yet been turned into practical politics
	CEU 98/18	New directive for maritime transport
	COST 322	Check
	Helios	Check
	Cost 335:	Accessibility for trains Recommendations concerning common European platform height, and concerning maximum differences in height when using ramp. Great Britain is the only country with a common platform height (91,5 cm). Comments to be supplemented
	The European Commission "Fourth Framework Transport RTD Work Program" (DG VII):	Contains details of completed research involving improved co-ordination and integration in the field of passenger and freight transport. There are no proposed actions suggesting that research or development is needed to improve inter-modal accessibility (in the sense of, for everybody). There is a reference to "integration of people with special needs" in the context of research into more demand-responsive urban transport systems, but that description concludes that "people with special needs are covered also by other EU Programmes such as COST 322, HELIOS etc.
	5 th Framework	Finished 2003
	6 th framework	Plans ??
	Barrier Free Europe	EU's answer to NOU 2001:22

Table 5. Existing projects concerning transport and mobility of travellers

Country/region	Rules and guidelines	Content
Ireland	Equal Status Act 2000	Discrimination prohibition covers accessibility for areas such as services open to public, eg. transportation.
Canada	Canadian Human Rights Act 1977:	The regulation covers main parts of the social settings, eg. accessibility for goods and services, work environment and living areas.
USA	The Americans with disabilities Act 1990 (ADA)	Regulatory requirements concerning all new buses, trains, and other means of transport run by the public, must be adjusted to people with impairments. Eg. transportation material and stations
Great Britain	The Disability Discrimination Act 1990 (DDA)	Resolution Great Britain, 1995. Regulation have increased accessibility within the public transport
Sweden, 1979	Regulation concerning impaired adjusted public traffic	
Netherlands, Great Britain and Province		A resolution is taken to ensure accessibility for impaired in public transport by 2010. A resolution have is also been

Country/region	Rules and guidelines	Content
Catalonia in Spain		taken to ensure accessibility in buss systems within 2008 and trains within 2020.
Global	UN's standard-regulation, Rule number 5:	Points out measures to be taken to remove barriers preventing accessibility for the physical environment. These should be focusing on developing standards and guidelines, as well as considering implementation of regulations to ensure accessibility, e.g. public transport. Little focus on means
	Directive 2001/85/EF (20.November 2001): "Bus directive".	The objective is to ensure harmonized decisions for approval of buses. The directive includes major aspects concerning bus safety e.g. stability, number of exits and emergency exits, as well as entrance possibilities for impaired. Lacks definitions of various functional reductions, and the needs as a result of this. E.g. lack of information systems on board in vehicle.
	Charter on access to transport services and infrastructure	ECMT (The European transport ministers conference) Declaration – Warszawa may 1999 - concerning accessibility towards transportation service and infrastructure. Not legally binding, but governments obliged to follow the contents. Means are not clearly defined.
USA	Section 508	Follow up ADA

Table 6. Existing rules and guidelines concerning transport and mobility of travellers

Tables provided above - covering standards, projects and measures - show mainly fragmented measures, without consideration for the total travel chain; standards are technical, too detailed, with a lack of overview, frequently not user focused [WG 141 N.57, A. Balfour, ANEC].

Finally, **ICTSB** recently has set up the ICTSB/ITS Steering Group (ITSSG). The ICTSB/ITS is formed to act as a forum to interface with the ITS stakeholder and industry on standardization issues for road transport and related multimodal issues, to ensure that ongoing standards activity in this domain reflects market requirements. The specific objectives shall be to coordinate the implementation of proposals for standardization in the recent report on requirements in this area, produced under EU/EFTA mandate, specifically in some areas, among which the "multimodal requirements".

7. Results: Work programs and risks related to subsequent standardisation activities

Given the general scenario, the market analysis results, the subsequent identification of the user needs, ongoing standardisation activities, a list of the main subjects of interest from the standardization point of view can be traced. This brings to tracing some first draft programs and, in certain cases, the eventual risks related to any standardisation activity in some fields of multimodal and interoperable transport.

7.1 Multimodal transport and mobility of travellers: main subjects and work program

Mobility and transport of travellers is not less important, but it seems that CEN Technical Committees have been in the past years quite more comfortable to face technical issues related to this subject: nevertheless, a number of standardisation problems remain to be covered.

The main subjects which should be covered in this context and might constitute a basis for a work programme are listed below:

1. User needs in the multimodal context
2. Integrated information systems
3. Integrated management of emergency systems and services⁵⁷
4. Integrated management of urban traffic in a multimodal context
5. Integrated management of interurban traffic in a multimodal context
6. Automatic payment systems for mobility of people
7. Control and management of multimodal areas utilised by travellers
8. Standards for reference

ANEC ha provided a first draft **Work Programme** for this context, reported below, in tables.

The following table refers to the planning of activities.

No.	Scope	Deliverable	Lead
1	Identify the different stakeholders from the standardisation arena (CEN TC's, ETSI, ISO), non –standardisation arena (different departments in the EU and national governments), different user organisations that should be actively involved in developing standards. Determine how to get them to work together in planned standardisation activities. NB. Stakeholders could be national/ international,: Consumers, Users organisations Standards bodies, transport operators, equipment manufacturers, architects, telecom/ solution providers, etc.	CEN Workshop on travellers needs/ standardisation	CEN BT / ICTSB / EU
2	Identify existing standards missing in this document overview that are of relevance to planned activities.	CEN Workshop on travellers needs/ standardisation	CEN BT / ICTSB / EU
3	Develop strategy for monitoring and follow up of proposed standardisation activities. Develop / assist with implementation plan.	CEN Workshop on travellers needs/ standardisation	CEN BT / ICTSB / EU
4	Improve co-operation between research programmes, standardisation bodies and businesses.	R&D Support Strategy	CEN BT / ICTSB / EU – Info Soc.

As regards the *scope of the work*, the following new /complementary standardisation activities should be developed [ANEC, 02.2003].

⁵⁷ See footnote n. 9.

In the *management* of the work, both (re)design process of transportation system and operation should be included.

No.	Scope	Deliverable	Lead
	Urban Integrated management of urban traffic in a multi-modal context	Guideline / Best practice	CWA
	Interurban Integrated management of interurban traffic in a multi-modal context	Guideline / Best practice	CWA
	Safety Integrated management of emergency systems and services, accessibility, system-management / user management	Guideline / Best practice	CWA
	Information Ensure accessibility of information, userfriendly, control of information, coordination of orders system/users, presentation	Guideline / Best practice	CWA
	Training Ensure correct training for employees to ensure that right information is given in the right way to the right person/persons	Guideline / Best practice	CWA
	Coordination of travellers / transport systems Ensure efficiency of the use of travels means. (E.g. 4 people in one taxi, etc.)	Guideline / Best practice research	CWA/ Research
	Evaluation / control / Management of quality of multi-modal areas utilised for travellers	Guideline / Best practice	CWA

Table 7. Management of the work

Tables concerning information systems, safety, ticketing, training, evaluation / guaranties and control follow hereafter.

No.	Scope	Deliverable	Lead
	Travel map, (Travel journey assistance) Develop and maintain a Traveller oriented road map for traveller related standardisation issues. The roadmap to start with users (e.g. access with wheelchair) and be structured round the travel chain, not technological solutions. The road map to be used to help coordinate and prioritise the many different standardisation stakeholders and activities, and links to non-standardisation activities. (E.g access to hotels, shops,etc)	Roadmap/ Business plan?	CEN BT / ICTSB /EU
	Standard timetables Standardise timetables, with regard to definitions, abbreviations, symbols, colour coding, structure of information presentation-information must be accessible according to user needs.	Standard	CEN TC 278, TC 122, ETSI TC HF
	Standard traveller information Standard to provide set of key traveller information in a standardised manner. Standard to cover both content –(e.g. definition of day pass) and presentation. Standard to cover relevant price information, information about location and access to location, obstacles etc. Architecture,Transportation vehicle, Way to terminal/stop, Available lifts etc, Doors open / close automatically.	Standard	CEN TC 278, TC 122, ETSI TC HF
	Real time information Traceable actions in transport system. Develop standard (s) that allow real time information throughout the travel chain so that the traveller is given updated information, (eg. delays) can change travel itinerary during trip and can receive feedback on the actions/ decisions taken as well as inform interested about changes made. (E.g. Persons waiting to receive travellers at stations / platform). Standard to include necessary feedback information to travellers through the total travel chain.	Standard	CEN TC 122, TC 278. ETSI.

	Interoperability of travel Information (channels: internet, mobile, sms, PDA, etc.) Ensure interoperability of traveller information (ITS) with other information providers (GIS) and infrastructures (telephony – mobile and fixed), other transportation providers (taxis) and assistive technologies. (This will require standardised communication protocols and coding of data to be communicated).	CEN ISSS WS	ETSI, GIS, W3C
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Table 8. Information: accessibility of information⁵⁸

No.	Scope	Deliverable	Lead
	Presentation of information according to personal profile Provide access to information in preferred channel, (e.g. choice of visual, audio or tactilely presented information), preferred language and character set. Provide information relevant to individuals personal profile (e.g. needs information on openings for wheelchairs, no smoking, facilities for deaf, children´s facilities) .	Standard	CEN TC 224 Wg 6 – Rev. of EN 1332-4, CEN TC 304, ETSI TC HF
	Signs, Pictograms, Icons, symbols, fonts Develop standard set of icons, symbols and pictograms to be used throughout the travel chain. Symbols to be tested according to ISO 9186 test method. Symbols to be accessible by audio/ tactile means. (Talking signs).	Standard	CEN TC 122/ TC 278/ ETSI
	Audio Develop a standard for quality of audio information provided in public spaces. Adapt from ISO 9921, “Ergonomics of speech communication”, 1996.	Standard	ETSI, CEN TC 122

Table 9. Information: presentation of information

No.	Scope	Deliverable	Lead
	Emergency situations Emergency services – standardisation – to be continued.	?	
	Control centre design	Standard	CEN TC 122 WG 8 ISO TC 204.
	Quality assurance of systems Risk analysis public transport – to be continued ...	Safety / Quality standard ?	??
	Priority It must be possible to prioritise certain vehicles in various situations. (Access of bus/train etc.)	Legislation standard	& TC 278

Table 10. Safety

No.	Scope	Deliverable	Lead
	Usability/ interaction Develop standards for user interfaces of ticketing systems (web, sms, self service machines) that provide a consistent and user friendly interface to the traveller. The standard should support access by assistive technology and the possibility to adapt the user interface (i.e. be compatible with EN 1332-4, “Coding of User Requirements”). The standard to build upon similar		TC 224 WG 6, W3C, CEN TC 278 WG 3, ETSI TC HF, CEN TC 122.

⁵⁸ The term “travel information” to include all informational elements that the traveller is likely to encounter in the travel chain, including but not limited to timetables, conditions for travel, fares, tickets (platform tickets), changes during travel (delays, change of platform). Standard (s) to include minimum content (e.g. where to get more help, route covered by timetable, etc), layout of informational element , use of colour coding of information, abbreviations and definitions, legibility requirements. Standard (s) to refer to symbol set for travellers. (see below). Information to be accessible by audio/ tactile means and to different technologies (PDA´s, mobile phones, TV monitors, on board travel mode).

	standards such as the EN 1332 series, ISO 9241 series on principles of user interface design, and national standards/guidelines for self service systems. Payment functions to be based on existing payment standards (CEN TC 224 WG 11).		
	Payment Ensure easy payment of tickets	Standard	CEN TC 224 WG 11, WG 6 / TC 278 WG 3
	Interoperability of tickets (from bus to train)	Standard	CEN TC 278

Table 11. Ticketing system

No.	Scope	Deliverable	Lead
	Giving information to travellers (automation of information)	?	?

Table 12. Training

No.	Scope	Deliverable	Lead
	Quality of transportation accessibility for passengers in transport		
	Service Ensure minimum quality of service in the travel chain		
	Control Ensure control of information, most essential information reaches the traveller		
	Travel guaranty provide guaranty that travellers get to the right place at the right time / penalties, or other travel options, ensure wheelchair can get into train etc.	Passengers charter	ANEC
	Performance criteria for accessibility for passengers in transport Develop standard for evaluating accessibility of different components / totality of the travel chain. Standard to include criteria for measurement, measurement units, acceptance criteria and test procedure and reporting requirements. Provide a set of standardised symbols/ texts that promote the test results.	Performance standard	CEN TC 122, ETSI TC HF

Table 13. Evaluation / guaranties /control

7.2 Multimodal freight transport: main subjects and work program

The main subjects which should be covered in this context and might constitute a basis for a work programme are listed below:

A. First part: general context, rules and needs

1. Terminology (multimodal, combined, UTI, transshipment...)
2. UTI (dimensions and use of tags,...)
3. Vehicles and material handling systems (performances and limits)
4. Infrastructures (container and inland terminals, logistics centres)
5. Logistics and transport (constraints and needs)

B. Second part: Telematics (ITS)

1. Aims and applications
2. Road-rail combined transport
3. Containers transport and transshipment (Cargo Community Systems)

4. Bulk freight transport and logistics
5. Multimodal infrastructures: inland terminals
6. Multimodal infrastructures: container terminals
7. Multimodal infrastructures: logistic centres (freight villages)
8. Dangerous goods transport and logistics
9. Integrated information systems
10. Integrated payment systems related to freight transport
11. Standards for reference
12. Annexes (Bar codes, XML, smart cards, AVLS, AEI systems,...)

Besides, according to:

- the market analysis developed in the period July-October 2002;
- the knowledge of the market available within the UNI/UNINFO Committee “Traffic and transport telematics systems”;
- the expertise made available during the preparation of the Business Plan, mainly provided by convenors and representatives of working groups somehow related to telematics, transport and logistics;
- the suggestions and counsels provided by operators operating in multimodal transport, both directly or through their associations (Europlatforms, UIRR,...);

the following *main points* and related *risks* can be stated.

- a. As regards *rail-road combined transport* and many *inland terminals*, the European market is dominated by some relevant companies, typically one per country; their activity within projects funded by the EC (Cesar I, II⁵⁹) has led to an interoperable system for managing the booking, the confirmation, the data exchange, the entrance of lorries and associated cargoes at the gates of the terminals, which is now used by the French, the Italian, the Swiss and the Dutch main operators as well as by the British and the Spanish ones, these lasts only for the international shipments; the German operator has his own systems, which is anyway able to communicate with the one realised within Cesar projects; the development of a standard would be quite welcome, though the feel is that the diffusion of the mentioned system could be obtained even without the intervention of standard bodies, given the active presence of the UIRR, which already coagulates the interests of the rail-road combined transport⁶⁰; there would be a keen interest in the possibility of identifying automatically a train, maybe with a standard European AVI (this would need both the intervention of Railways Association UIC and of standard bodies. There is even a need of tracking and tracing the loading units (swap bodies and semi-trailers, in this case) both when handling them with transtainers/cranes/fork lifts within the terminals and when transporting them on rail wagons; such a need is particularly felt when dealing with frozen goods or freight with controlled temperature (some applications are already undergone) or with dangerous goods.
- b. As regards intermodal *container terminals*, a great need for cargo community systems (CCS) linking ports and logistics platforms, as far as useful, is felt; still such a need seems to find more an answer in a common European Architecture than in new standards. As a matter of fact, the knots or difficulties on the path of a seamless intermodal transport are mainly related to:
 - the exchange of data and documents among different modes of transport,
 - the need to involve in the telematic context some key operators who, at the time being, are not and seem not to be interested, given organisational or convenience of the present structure; such operators can be recognised, for example, in custom Agencies (international transport of containers or relationships with Eastern European countries); therefore, telematics standards needs can be seen in the data exchange and the related structure of messages, i.e. the already existing EDIFACT or XML; still, it does not seem interesting for the market to have a standard CCS but, instead, a common intermodal architecture⁶¹;
 - the need to know the position of containers within ports and intermodal terminals; again, in this case, there should be a common approach, according to the operator, derived from the automatic location of vehicles

⁵⁹ See footnote n. 23.

⁶⁰ [Cemat (I), 10.2002].

⁶¹ [WG 141 N 20, P. Donazzon, Teleporto Adriatico, I]

and handling systems through which UTIs are moved; it would be an endless and useless activity the attempt to standardise any device for localising directly containers, since these ones do not move by themselves; so it is more efficient to locate the means for transporting the UTI and to associate each time the means and the UTI wherever the interchange or stoking occurs. Again, this need seems to correspond to a common Architecture activity more than a standardisation one.

- c. As for *freight villages*, the most enhanced context can be seen in a little number of European logistics platforms; the need of adopting telematics systems is very well felt among operators, as it can be even proved by the investments that some of the administrators of freight villages are making at present; the diffusion of ITS in this context means mainly a telematic control of the administered territory and the management of a number of services, among which one of the most important is the relation with intermodal terminals, within or outside the platform itself. In these terms, there is a need of a common architecture, i.e. the identification of Functions – associated to user needs expressed by logistics and transport operators – and related Data Flows, Data Stores and a Physical viewpoint. Freight villages need a standard for the control of the gates through AVI/AEI systems. Such activity is already undergoing within ISO. Some applications already exist in some Freight Villages (e.g. Bologna): though there is a need for a common standard for allowing lorry drivers to enter and exist logistics platforms with the same on-board units, there is an actual risk that a standardisation activity in this context could rise a never-ending situation, given by the juxtaposition of existing de facto standards and the will and aspirations of some telematics industries; at the same time, there is the risk that the existing applications could bring to a carelessness for this need in order to avoid the diffusion of other existing applications.
- d. As regards transport of *dangerous goods*, it is a field which definitely demands the application of telematics; both an architectural approach and standardisation activity is needed; a declaration of an urgent need of standardisation has emerged, for the definition of: communication protocols for data exchanges among the operators of the same or different transport modes involved in the hazardous material transport (telecommunication network), procedures for information exchanges between operators and public authorities, technological equipment for hazardous materials control during handling and transport⁶²; still, any standardisation activity in this context should be limited to the automation of the remote control of cargoes and vehicles, and knowledge of the situation by the transport company and by the body in charge of the civil protection⁶³; any further activity should be carried in strict relation with the bodies involved in dangerous goods regulations, which are already very active since many year.
- e. As regards the *express couriers* market, any standardisation or architectural activity which tried to introduce “rules” within the process could fail, given the private organisation of this market; still, operators appreciate a lot the undergone standardisation activity related to bar-codes and automatic identification systems. There is even interest for AVLS, GIS and AVI/AEI.
- f. As regards the intermodal transport units, while the equipment of standardised ITU with AEI systems is quite acceptable and welcome in all transport modes, it does not seem to be a user requirement of the widely most expressive part of users and stakeholders⁶⁴ the change of dimensions and unification of dimensions of swap bodies and containers in order to standardise a unique loading unit: therefore, despite the interesting proposals reported in the Consultation paper by the European Commission⁶⁵ “Harmonisation and Standardisation initiative”, *containers and swap bodies have independent logistics cycles* or chains, require different devices for their handling within intermodal terminals and have quite different economic and rate rules, besides having quite different loads.
- g. As regards the *emergency services* - both for automatic dispatching of ambulances and for intervention in case of calamities - there is the feeling of a general need to diffuse such systems in Europe; sometimes this feeling is proved by declared interest of operators in such systems, on occasion even supported by pilot projects in progress; thereafter the need for such systems is mainly related to a common architecture approach, though some standardisation needs could rise whenever any company or body started to realize a pilot project.

⁶² [WG 141 N 24, "Intermodal Transport of Hazardous Materials", Politecnico di Milano (I)].

⁶³ [WG 141 N 26, comments by M. Sorgetti, FIATA, Geneva (CH)].

⁶⁴ UIRR, Rail-road combined transport operators; aware note in [R.D. Mann, CEN/TC 15, DIN, 28.10.2002].

⁶⁵ See footnote n. 17.

- h. Both public administrations involved in passengers' transport and emergency services and those related to transport and control of dangerous goods, express an interest for a public access mobile radio (PAMR) system, which some already recognise in the ETSI standard *TETRA*.
- i. In general, it is quite important to avoid any standardisation activity coming from a strict and sole agreements of producers (industries supplying ITS): the application of a unique automatic toll system, where applied at a national level, has been the consequence of the national toll motorway *Operators' Agreement* [WG 141 N 23]. As regards an *interoperable network for travellers*, there is a need for an automatic measurement of any information related to traffic and weather conditions in the motorway stretches and railways, by the use of all technologies (like video cameras, magnetic loops, vehicle counters, DSRC-based systems offering new opportunities, AVI/AEI for trains,...) then to compare such data with free flow travelling time by vehicle type (cars, light trucks, lorries) and weather conditions. In this context, it is outlined the missing of management standards for data exchange and diffusion as well as the lack of integration among the existing technical standards for data exchange⁶⁶. As regards travellers' mobility, an expressed problem is that – with reference to ISO CD 11550, ISO DIS 11549 - it exists a not European coding: based on BS: the expressed need would can be translated into expanding/extending coding to include other languages. Relating to this matter, there is the problem of how to get information in a desired language: referring to standard for language options (EN 1332-4 - Coding of user requirements), the aim would be to expand/extend/develop standards on language. Besides, when measuring and providing information on accessibility of intermodal transport, there should be some criteria for accessibility: there are different groups of users, different metrics; the need would be for a standard for information on accessibility⁶⁷. As regards an *interoperable network for travellers and trucks*, there is a need to realise an interoperable access control system for toll motorways, multimodal platforms and city centres, in order to: ensure the respect for the legal regulation related to the historical city centre access, ensure a constant monitoring of the access points, identify the violation with high accuracy; as for the freight multimodal centres, this would be pursued in order to manage area access control by vehicles and prepare related statistics, manage automatically the exit authorisations for the commercial vehicles, access lanes central supervision and monitoring. There is a missing management standards for data exchange and diffusion in this context [WG 141 N 23].
- m. The market of operators⁶⁸ feels that there is a lack in the standardization activity concerning *codes* (freight, means of transport, intermodal platforms identification, etc.). Freight, for example, is related to different kind of codes, which depend upon the destination of the related documents: combined system of naming for Custom documents, code NIMEXE for European statistics, code EDIFACT for Edifact applications, CTCI ("Classificazione Tipo per il Commercio Internazionale", i.e. Model Classification for International Commerce) for document requested by United Nations, etc.
- n. Whatever activity was activated on freight and fleet management, it should involve the *public interest*, given the experiences in the last years within the WG 2 of TC 278⁶⁹.
- o. There is a need for harmonization between freight and travellers standards based on common modelling (using UML), terminology etc. to yield economy in the development of software components.
- p. It is necessary to identify "*really new*, not yet addressed, intrinsic standardisation requirement regarding Intermodal freight ITS (this does not comprise the necessity of co ordination of already started initiatives), which could justify new Work Items (wait to know more from ISO TC 204 proposal)"⁷⁰. "The exploitation by CEN and the Commission of CEN M 270 phase 2 results" could also be considered.
- q. The need for technical standards, in most cases, more related to the data exchange, their protection and security.
- r. A particular care, referring to telecommunication networks, should be devoted to the need to link and switch between client devices: e.g. a PDA while seated on train, a mobile phone while walking in an interchange area or riding a bicycle.

⁶⁶ [WG 141 N 23, P. Giorgi, Autostrade SpA, I].

⁶⁷ [WG 141 N 32, Balfour, ANEC]

⁶⁸ Teleporto Adriatico, at Port of Venice (I).

⁶⁹ It is deduced by [WG 141 N 15, French contribution].

⁷⁰ [WG 141 N. 7, J. C. Renesson, WG 2, CEN TC 278].

- s. If any *priority*, within the various subjects involved in multimodal and interoperable ITS, had to be established for upcoming standardisation activities, the market analysis highlights that this should be attributed to systems and services of *public interest*, no matter if they deal with transport of goods or people's mobility. This way, within the freight transport context, the tracking, tracing, monitoring, the assignment of paths, the remote control by public authorities and civil protection bodies - with common interfaces and pre-defined data – of *dangerous goods* seems to be a subject generally deemed important; on the people's mobility side, integrated systems for *emergency services* seem as well to be felt by stakeholders as noteworthy and having a priority over other subjects. Nevertheless, any standard activity should be immediately related to pilot projects, in order to avoid subsequent difficult applications of standards.

8. Conclusions

The context of multimodal transport telematics is remarkably different in the case of travellers than in the case of freight while occasionally sharing the same physical infrastructure. We need therefore to consider them *separately*⁷¹ and also coordinate them at the basic level

1. Multimodal transport and mobility of travellers.

The current focus in the standardization of passenger transport telematics is *information sharing, integrated payments and emergency services*. Several activities are currently ongoing, in particular for the road environment and separately for timetabled services. Considering the quantity and quality of the resources involved, it is likely that the portfolio of the existing standardization initiatives will evolve without external intervention to include all the aspects that during time will become of interest to the market. The main requirement for a spontaneous and efficient evolution of the standardization activities is the absence of artificial barriers preventing a structured participation in the works by all stakeholders. This barrier currently exists concerning personal and timetabled transport modes.

2. Multimodal and/or intermodal freight transport and logistics.

Different bodies have been developing several building blocks, but the efforts fall short of dealing satisfactorily with the matter.

The main reason is that these initiatives were not conceived in a multimodal context; with very few exceptions multimodality came in, so to say, along the way. If an architectural metaphor can be used, we have a huge pile of excellent bricks available, but, as far as multimodal transport is concerned, no one has taken the pain to think at what the building will be used for, and no architect has drawn the overall plan. The lack of an agreed vision prevents any successful development, as stakeholders, if by any chance they come to grips with standardization, find themselves in an unfriendly environment. This single shortcoming can help to explain why WG141 found ample evidence of users interests, and yet at the same time several NSOs complained about lack of user participation.

3. Common elements of both standardization sectors

Notwithstanding the differences between traveller and freight/logistics modes, there are also opportunities for use of common terminology, harmonized schema modelling and conformance with existing standards.

CEN should strive to make available as soon as feasible the two main missing bits:

- A consistent set of separate and common user requirements of freight, logistics and traveller sectors;
- An architecture⁷², consequent to these shared and separate requirements, identifying building blocks and their interactions and, if found to be useful a harmonized schema.

Proper standardization activity, if any will be required, will come downstream of this exercise.

Given the well-known constraints of efficiency and timeliness, it is proposed to rely on mechanisms of the type of Workshop Agreements (CWAs). Several inputs are already available both from national (ARTIST, ACTIF) and European environments (KAREN/FAME). All is needed is a catalyst to foster harmonisation.

Work items which should be taken into account follow from the needs expressed by the market and risks related to subsequent standardisation activities (chapter 7) and should be mainly gathered within:

⁷¹ Request expressed by many stakeholders, in particular by FIATA (*Fédération Internationale des Associations de Transitaires et Assimilés*), i.e. International Federation of Freight Forwarders Associations, <http://www.fiata.com/>.

⁷² An Architecture represents the structure which identifies – on the basis of the needs expressed by users and stakeholders – the functions, the features and the relations among all the elements implicated by telematics in pursuing Intelligent Transport Systems: services, technological systems, actors, eventual technical standards.

- Multimodal transport and mobility of travellers;
- Multimodal and/or intermodal freight transport and logistics;
- Common elements of both standardization sectors;

all following the notes and details mentioned in the present document.

The national bodies that have contributed to this report are willing to take the lead of such an initiative.

The analysis required to author the present report has shown that multimodal transport issues, for their own nature, cut across existing organizations which are developing standards and also across the expertise they draw from. There is therefore an ongoing need of harmonisation in planning and execution; the very existence of WG141 is an evidence of such a need. The problem arises of how to fulfil this requirement also in the months and years to come. The suggested solution is that this responsibility is assigned to a proper organization operating across the three European standard bodies, and reporting to a relatively high level in the hierarchy.

9. Recommendations

Four initiatives are recommended. The first two are initiatives with a tactical value, aimed at producing specific deliverables that are considered as urgent requirements for work progress. The third aims at ensuring that all the facets of the problem are taken into due consideration and work does not focus exclusively on some aspects. The fourth has a strategic goal, because it aims at filling a gap in the current allocation of responsibilities to organisations. The four initiatives are:

1. Start new work items as appropriate (refer to sections above for details) in the area of “Multimodal transportation of people with disabilities”. On a case by case basis, it should be decided if the activity is to be carried out in a workshop environment (e.g.. CEN/ISSS workshop DfA Design for All) or in a formal Technical Committee;
2. Start a new activity with the title “Multimodal Freight Transportation: User Requirements and Architecture” in order to produce a deliverable of the CWA type;
3. Ensure that at the level of the components that make up a multimodal systems (e.g. vehicles), the standardization of the interfaces that allow multimodal operations is adequately covered by the organisations already active in the domain;
4. Ensure that the responsibility of the harmonisation of standardization activities in the area of multimodal transportation is assigned, for co-ordination, to an appropriate organisation, as an ongoing task. The ICTSB ITS Steering Group seems to be the ideal seat for such an activity, provided its scope includes all types of common aspects in transport, and is not restricted to the road mode.

10. Main basic bibliography

- [1] CEN-ISSS, European standards in Intelligent Transport Systems - Open meeting, Brussels (B), 24.05.2002
- [2] Economic and Social Committee, *Opinion of the Economic and Social Committee on the 'White Paper on European transport policy for 2010:time to decide' (COM(2001)370 final)*, (2002/C 241/32), C 241/168 EN 7.10.2002 Official Journal of the European Communities
- [3] European Commission, Directorate General for Energy and Transport – Directorate for Trans-European Networks Energy & Transport, "Intermodal Loading Units – Harmonisation and Standardisation initiative", Consultation paper, Brussels (B), 15.03.2002.
- [4] European Commission, *White Paper - European transport policy for 2010: time to decide*, COM(2001) 370 final, Brussels (B), 12.9.2001
- [5] FRAME-S (FRamework Architecture Made For Europe - Support), IST Programme (Information Society Technologies), Call Identifier "Continuous submission" (Accompanying Measure), Key action 1, Action Line: IST-2000-1.5.1, Contract number "IST-2000-29663", 2001-2004.
- [6] ISSS, "European standardization in Intelligent Transport Systems - A proposed European Programme", European ITS standards Programme Final version 3.0 CMC/ISSS 5, August 2002
- [7] THEMIS (Thematic Network in Optimising the Management of Intermodal Transport Services), "Proposal for a feasible, user-driven, system architecture to combine TMS and freight operation aspects", (DG TREN, 5th Framework Programme, GROWTH, Contract: GTC1-1999-10006), Deliverable D3.1, March 2002
- [8] UIRR, *UIRR Position Paper on the Consultation Paper of the European Commission "Harmonisation and standardisation of Intermodal Loading Units"* (24.05.2002), <http://www.uirr.com/document/news/Stell-Konsult-LE-fr.pdf>
- [9] UNI - CEI, "Telematica per il traffico ed il trasporto su strada - Norma quadro - Prospetto generale delle applicazioni, riferimenti ed indirizzi normativi" (UNI - CEI 70031), "Allegato alla UNI CEI 70031", Milano, July 1999
- [10] United Nations – Economic Commission for Europe, *European Agreement on important international combined transport lines and related installations* (AGTC), Geneva (CH), 1999
- [11] United Nations/Economic Commission for Europe (UN/ECE), European Conference of Ministers of Transport (ECMT), European Commission (EC), *Terminology on combined transport*, United Nations, New York (USA) and Geneva (CH), 2001

11. Annexes

Two annexes are reported below.

The first one contains the first recommendation by CEN/TC278 - Work Programme on Multimodal requirements: the extract has been included herewith because of the relevance of the subject in relation with the aims of this Business Plan. However, it must be intended as a report document, giving general information about multimodal transport.

The second one contains all documents that have been provided by the Working Group, excluding any papers, suggestions, e-mail correspondences, provided by any operator, user or stakeholder during the market analysis (July 2002- March 2003).

11.1 Specific recommendations by TC278 Work Programme: “Recommendation 1 – Multimodal requirements”⁷³

There is a need for a consistent set of standards for multimodal aspects of ITS. In the case of intermodal aspects that concern road transport, the existing CEN TC278 work programme should be re-examined to ensure that due account is taken of multimodal requirements, by amending work items and drafts in progress where that is appropriate.

Scope

The expansion of multi-modal transport, and particularly information services supporting such multi-modal shifts (both for travellers and freight), requires, among other things, review of those parts of the present CEN TC278 work programme that have not been completed. This activity will require discussions with interested parties regarding rail, waterborne and air transportation.

Rationale

The TEN-Transport (TEN-T) Expert Group on ITS for Road Traffic Management was set up to help the European Commission in the revision of the TEN-T guidelines following a proposal of the EC to the TEN-T Policy Committee. The TEN-T guidelines contribute to the deployment of measures and projects dealing with safe and efficient movement of people and goods throughout Europe, amongst its goals it lists :

“promoting the use of multi-modal door-to-door travel services to encourage optimum use of available transport modes”

The basis for successful use of multimodal transport (including PUBLIC transport) is that multimodal transport systems are adapted to suit people needs (access, ease of use- physical design of systems, design of supporting ITS systems . ticket machines, timetables, etc). The term .people. includes people who are elderly and disabled. The starting point for this activity therefore must be the end user not technology. As the document notes, the TEN-T Policy Committee wishes to .promote the use of door-to door travel services. CEN/TC278 will therefore need to examine its work programme against this background taking due account of user requirements.

One specific additional intermodal deliverable is proposed: Standardized definition of public transport-related customer information data

Lead Responsibility

CEN TC278 – should also provide the telematics interface between road transport and other modes of transport in a multimodal environment. BT/WG141 has been established to prepare a Business Case for activity in the area of Multimodal and interoperable freight and passenger transport.

Deliverables

- (a) Initially :New Programme of Work items needed to be converted into multi-modal deliverables ;
Negotiation with UIC, IATA, other CEN TCs, eBES / EEG2 Transport, CENELEC TC9X
- (b) Standardized definition of public transport related customer information data
(Standard : TS leading to an EN).

Strategy

Specific work items to support the extended work programme to be identified by the TC or prompted from EU programmes and assigned to Working Groups.

⁷³ European ITS standards Programme Final version 3.0 CMC/ISSS 5 August 2002, Page 18/92.

CEN needs to ensure that it has adequate cross committee arrangements in place, and the CEN/CENELEC/ETSI Joint Programming Committee – Rail needs to be involved.

Priority

Urgent

Timetable

Work item adoption within 6 months. Deliverables timetable to be decided by the responsible technical group.

Liaisons/identified partners

There needs to be a negotiation with UIC, IATA, other CEN TCs, eBES / EEG2 Transport and CENELEC TC9X to accept the extension of scope and negotiate acceptable boundaries. These bodies need subsequently to be actively associated with the development of the work.

Support required

The support required is not financial. In order to achieve/progress this work, EU and EU projects need to make formal written requests with their requirements to TC278 to expand their existing work programme to cater for multi-modal transport and multi-modal shifts. A formal support of EU to the extension of the work programme, and input to other standards groups who have a boundary interface explaining this need may also be required.

11.2 List of documents used for the preparation of this Business Plan

CEN BT/WG 141

Intermodal and interoperable transport - Telematics

The CEN Bureau Technique during its meeting held in Brussels on 6-7 May 2002 set up the CEN BT/WG 141 "Intermodal and interoperable transport - Telematics" to prepare the Business Plan. The decision was prompted by an Italian contribution (page 4 doc. BT N [6621](#)). The scope of the document covers the areas detailed in BT N 6621. The Business Plan will be submitted to CMC for circulation before end of September 2002. UNI/UNINFO coordinate this initiative.

UNINFO Committee "[Traffic and transport telematics systems](#)" has been working in the last few years and is currently working in the area of multimodal and interoperable freight and passengers transport telematics.

Details on the ongoing activities and available documents can be found in the UNINFO pages ([documents - meetings](#)).

Chairman: Giovanni Gaudino (ELSAG), Chairman of UNINFO Committee "Traffic and transport telematics systems"

Secretary: Massimo Actis Dato, UNINFO General Secretary
 contact for information:
UNINFO Secretariat (Ms. Carla Bertinetti, e-mail: bertinet@uninfo.polito.it)

[CEN BT/WG 141](#) [Telematica per i trasporti](#) [Commissione UNINFO](#) [UNINFO home](#)

CEN BT/WG 141

Intermodal and interoperable transport - Telematics

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Documents

Doc. n°	Title	Date
WG141 N57.doc WG141 N57.doc - Review accepted	Contribution on Business Plan, doc. 48 (<i>This programme has been developed with contributions from ANEC, the Norwegian Department for Health and Social Affairs, ETSI TC HF Chairman, and Manager for Norwegian Information Technology Standards</i>)	28/02/03
WG141 N56 ISO/PAS 16917	Mr. Rolf-Dieter Mann - ISO/PAS 16917:2002-12-15 - Ships and marine technology - Data transfer standard for maritime and intermodal transportation and security	06/02/03
WG141 N55	RE: ANEC2003/ICT/011 CEN BT WG 141 Passenger Mobility draft for comments by A.Balfour	05/02/03
WG141 N54a WG141 N54b.msg WG141 N54b.doc	Request from ANEC to have an additional document Clarification from CEN BT/WG 141 Secretary	05/02/03
WG141 N53a WG141 N53b.msg WG141 N53b.doc	Proposal from ANEC to have an additional document Answer from CEN BT/WG 141 Secretary	05/02/03
WG141 N52	CEN/BT WG 141 - Cancellation of the meeting in Bruxelles, January 15, 2003	12/01/03
WG141 N51	ETSI's comment on Massimos's text proposal (<i>doc. N 49</i>)	10/01/03
WG141 N50	CEN/BT WG 141 - Cancellation (proposal) of the meeting in Bruxelles, January 15, 2003	09/01/03
WG141 N49	Additions to the WG 141 Business Plan, doc. N 48 (<i>proposed by Mr. Massimo Actis Dato, following the participation of ICTSB ITS Steering Group in Bruxelles on Jan 6th</i>)	09/01/03
WG141 N48	Business Plan (final version) for discussion at January 15, 2003 meeting	23/12/02
WG141 N47	Draft Agenda for the 4th Meeting, Bruxelles, January 15, 2003 (h 11.00 -16.00)	17/12/02
WG141 N46	Message of Mr. Massimo Actis Dato - Schedule of Work - Next Meeting: Bruxelles, January 15, 2003	09/12/02
WG141 N45	Message of Mr. Adam Balfour, ANEC - Counter proposal CEN BT WG 141 - Next meeting {01}	03/12/02
WG141 N44	Message of Mr. Massimo Actis Dato: CEN BT WG 141 - Next meeting	28/11/02
WG141 N43	ANEC Comments on draft Business Plan, doc. 37 (2nd contribution)	12/11/02
WG141 N42	ANEC Comments on draft Business Plan, doc. 37	07/11/02
WG141 N41 WG141 N41c	ETSI Comments on draft Business Plan, doc. 37	06/11/02
WG141 N40	Activity report 12 Nov 2002	12/11/02
WG141 N39	Business Plan, draft final version	11/11/02
3rd Meeting	Turin, 2002-10-28	

WG141 N38	Minutes of the Third Meeting, Turin, 2002-10-28	30/10/02
	Next Meeting in Turin Logistic Information: http://www.comune.torino.it/english/ http://www.turismotorino.org/home.php?lang=en Hotels: http://www.turismotorino.org/Alberghi/index.php?lang=en&tipo=Alberghi	15/10/02
WG141 N37 (doc) WG141 N37 (pdf)	Business Plan - final draft	29/10/02 deadline 07/11/02
WG141 N36	LBS – Our 24/7 life events assistant? (Mr. Ford)	28/10/02
WG141 N35	ISO/TC 211 WG 8 Comments on CEN/BT/WG 141 N. 30 Rev (Mr. Ford)	28/10/02
WG141 N34	Attendance List of Delegates (3rd Meeting: Turin, 2002-10-28)	24/10/02
WG141 N33	Suggestions and contributions received on Business Plan (third draft), doc. N 30	30/10/02
WG141 N32	ANEC - presentation on the work on Passenger Mobility/ITS (by Mr. Balfour)	28/10/02
WG141 N31	ETSI Contribution (by Mr. Ochel)	25/10/02
WG141 N30Rev	Business Plan - Third Draft (for discussion to the next meeting in Turin)	22/10/02
WG141 N 30	Business Plan - Third Draft (for discussion to the next meeting in Turin)	11/10/02
WG141 N29Rev2	Second Revised Agenda	24/10/02
WG141 N29Rev	Revised Draft Agenda	22/10/02
WG141 N 29	Draft Agenda	10/10/02
2nd Meeting	Milan, 2002-09-20	
WG141 N 28	Søren Østergaard - Comments on the Draft Business Plan, doc. BT WG 141 N 18	23/09/02
WG141 N 27	S. Manfredi (CSST) - Presentation: ARTIST - Italian ITS Architecture - Ministry of Infrastructures and Transport	08/10/02
WG141 N26Rev	Report of the Second Meeting - Milan (Italy) 2002-09-20	22/10/02
WG141 N 26	Provisional Report of the Second Meeting - Milan (Italy) 2002-09-20	08/10/02 deadline 21/10/02
WG141 N 25	TTS (Italian National Association for Telematics for Transport and Safety) - Presentation	01/10/02
WG141 N 24	R. Maja (Politecnico di Milano) - Presentation: "Intermodal Transport of Hazardous Materials"	01/10/02
WG141 N 23	P. Giorgi (Autostrade) - Presentation: "Needs and benefits of interoperable transport systems"	01/10/02
WG141 N 22	B.Dalla Chiara (Politecnico di Torino - D.I.T.I.C.) - Presentation: "BUSINESS PLAN (2nd draft)"	01/10/02

WG141 N 21	Adam Balfour (ANEC) Presentation: "Consumers & intermodal transport Standards requirements"	01/10/02
WG141 N 20	P. Donazzon (Teleporto Adriatico) - Presentation: Informatic Management of Distributed Logistic in the Ionic Adriatic (<i>G.I.L.D.A. - Area Gestione Informatica della Logistica Distribuita nello spazio Adriatico-ionico</i>)	23/09/02
WG141 N 19	Document Register	19/09/02
WG141 N18	Business Plan - Second Draft	18/09/02
WG141 N 17rev1	Attendance List of Delegates (2nd Meeting: Milan, 2002-09-20)	19/09/02
WG141 N17	Provisional Attendance List of Delegates (2nd Meeting: Milan, 2002-09-20)	16/09/02
	Next Meeting in Milan - Logistic Information	09/09/02
WG141 N16	ANEC Comments on Business Plan (doc. CEN/BT WG 141 N 5) and scenario (CEN/BT WG 141 N 6)	02/09/02
	European standardization in Intelligent Transport Systems - A proposed European Programme	26/08/02
WG141 N15	French Contribution to the 2nd Meeting, Milan, 20 Sept 2002	27/08/02
letter290702	Next Meeting: 2002-07-29	29/07/02
WG14 N14rev1	Second Revised Draft Agenda - Second Meeting - Milan (Italy) 2002-09-20	19/09/02
WG141 N14rev	Revised Draft Agenda - Second Meeting - Milan (Italy) 2002-09-20	16/09/02
WG141 N14	Draft Agenda, Milan (Italy) 2002-09-20	29/07/02
WG141 N13	Draft - Terms of Reference (following from Kick-Off Meeting - Brussels, 3 July, 2002)	26/07/02
WG141 N12	Document ISO/TC 204 N 839 "Memorandum of Understanding between Signatory Committees (ISO: TC 8, TC 104, TC 122, TC 204, JTC1/SC 31, IEC TC 9) on Standards Development for Freight Movement within the Supply Chain"	17/07/02
1st Meeting	Brussels, 2002-07-03	
WG141N11-Attach	Attachment 1 of the Report: Attendance List	
WG141 N11rev	Report on the First Meeting, Brussels 2002-07-03	26/07/02
Dalla Chiara Comments	Dalla Chiara, Politecnico di Torino - D.I.T.I.C. - Comments on Draft Report - First Meeting, doc. 11	22/07/02
Wehnert Comments	Jürgen Wehnert, TFK Transportforschung GmbH Comments (Intersparced in the text of the Draft Report of the First Meeting)	18/07/02
Boyd James	Boyd James, CEN Management - Comments on Draft Report - First Meeting, doc. 11	16/07/02
WG141 N11	Draft Report on the First Meeting, Brussels 2002-07-03	11/07/02 deadline 22/07/02

WG141 N10	United Kingdom Contribution	01/07/02
WG141 N 9	Document Register	26/06/02
WG141 N8 rev2	Second Revised Attendance List	02/07/02
WG141 N 8 rev	Revised Attendance List	01/07/02
WG141 N 8	Attendance List	29/06/02
WG141 N 7	Memorandum on CEN BT WG 141 Meeting on July 2002 the 3 rd (Freight) (<i>source: Jacques-Claude Rennesson</i>)	26/06/02
WG141 N6r	Scenario: general contents, user needs, main topics and actors (<i>slides</i>) - <i>version 3</i>	03/07/02
WG141 N 6	Scenario: general contents, user needs, main topics and actors (<i>slides</i>) - <i>version 2</i>	26/06/02
WG141 N5r	Draft Framework for a Business Plan (<i>revised on line in the meeting</i>)	03/07/01
WG141 N 5	Draft Framework for a Business Plan (supersedes doc. N 4)	26/06/02
WG141 N 4	Draft Framework for a Business Plan	27/05/02
WG141N3rev	Revised Draft Agenda for the 1st Meeting, Brussels, 2002-07-03	26/06/02
WG141 N 3	Draft Agenda for the 1st Meeting, Brussels, 2002-07-03	18/06/02
WG141 N 2	Intermodal and interoperable transport - Telematics (<i>Background, Proposal and actors</i>)	30/05/02
WG141 N 1	Nomination Form	30/05/02 due date: 14/06/02
WG141-Inv.	BT/WG 141 - First meeting	30/05/02
BT 6650	RESOLUTIONS TAKEN AT THE 51st BT MEETING BRUSSELS, 2002-05-06/07 (v. pag. 5 - Res. 07)	10/05/02
BT 6621	Intermodal and Interoperable passenger transport – Report of workshop (failed Resolution BT C 8/2002)	23/04/01