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Intelligent transport systems — Public transport — Traveller Information for Visually Impaired People (TI-VIP)

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National foreword

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Intelligente Transportsysteme - Öffentlicher Verkehr- Reiseinformationen für sehbehinderte Menschen (TI-VIP)

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Foreword

This document (CEN/TR 16427:2013) has been prepared by Technical Committee CEN/TC 278 “Road transport and traffic telematics”, the secretariat of which is held by NEN.

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0 Introduction

0.1 General

Advanced societies try to make life easier for their physically and mentally handicapped citizens so that they can participate in daily life without the help of others as far as their disability allows. Most European countries have adopted or are adopting laws that ensure that almost all disabled people have equality in the accessibility of the specific transport information that they need. Operators will have to meet specific requirements and recommendations according to particular deadlines set for each country. Whilst it is important to establish a Technical Specification as soon as possible to achieve harmonisation and to avoid the development of several incompatible solutions, this document is a Technical Report of the preliminary work undertaken by a sub-group of TC 278 WG3 towards that goal. It should form an input to the preparation of a Technical Specification when resources become available for that work to take place.

Passenger information facilities which provide all the useful information needed for visually unimpaired passengers during a journey (arrival and departure time, waiting time, changing stop/station, terminus or line number and destination of the vehicle which is actually at the stop, etc.) should also make this information available to VIPs in a suitable form. However, it should be recognised that Visually Impaired People (VIP) will require some device to effect communication with fixed and mobile elements of the public transport system (stops, buses, trams etc). The target is that unimpaired and impaired people should have the same level of information.

Journey Planners, which provide the information system for self-reliant passengers, were not included in the work for this Technical Report.

“Design for all” should take into consideration visually impaired people (VIP) and their specific needs. For these people it is a question of conveying meaning through sounds, speech and touch, since auditory and tactile channels are often their only means of gaining information.

Particular concerns of VIP are:

— Accessibility: To have easy access to, and to be able to visit, familiar and unfamiliar places by themselves;

— Relevance: To be able to locate themselves (know precisely where they are) in the environment and to discover nearby stops, stop names, available lines, their next journeys with an indication of departure time and arrival time, etc.;

— Reliability: To be able accurately to reflect the current situation so that their mental “picture” matches with reality;

— Safety and security: To be able to avoid falls and collisions (safety during boarding and alighting is a special concern), as well as feeling secure in taking a certain path.

For VIP, entering an unfamiliar environment or making a new journey is especially difficult. It is important to recognise that improved information systems will not solve all of the challenges and it is important also to make plans for assistance and support services. Standards for best practice within such services may also be helpful.

Modern electronic technologies can provide VIP with better information. Services for VIPs, whenever possible, should be an additional or specialised form of MMI (Man Machine Interface) from services which are also available for unimpaired travellers. It will be necessary to be clear which aspects are included in each existing standard or Technical Specification and which are not:

— The first issue to consider is which end-to-end sequence of technologies will have to be used to deliver such systems, including information about existing systems, devices, standards and Technical

Specifications. The following classification of devices, together with their communication characteristics, are suggested as the basis for a Technical Specification.

— Different classes of end-user devices offer different levels of services. Current technologies offer many possible solutions with different levels of ease of use. Three different classes of devices can be considered:

1) One way communication device: The VIP is equipped with a simple command transmitter with a small and ergonomic embedded tactile keypad. The command receiver connects either to the on-vehicle device (e.g. vehicle controller, which incorporates the necessary passenger information), or to an infrastructure controller, to get an appropriate announcement, typically in the local language, or to trigger some other action.

2) Two way communication device with integrated text to speech: The device is equipped with a small and ergonomic tactile keypad, usable by left and right handed people, and equipped to offer an acknowledgement signal (vibration, tone within a given time, etc.) and with a small loudspeaker and/or is able to connect to ear-phones. The audible information is output by the personal device using text to speech (TTS). The device receives the information as structured data (for example XML). The keywords (for example stop, direction, etc) are output in the user's mother tongue whilst the data (for example stop names) are received as text in the local language and output (not translated) by the device in the local language. This system should be able to import the trip information from a travel information system, so that the user gets appropriate current information on request during a journey.

3) More sophisticated systems which use standard devices such as smart phones. Such devices should be equipped with a special MMI for VIP: The keypad shall be tactile, usable for left and right handed people and equipped to offer an acknowledgement signal. (Vibration, tone within a given time, etc.) This device should be able to communicate with a centralised travel information system to make an online rerouting in case of problems arising during the trip. It also should be possible to get travel information from the user's current position to a personally-defined destination (address and/or stop/station). It should be able to provide absolute or relative positioning, for instance GPS (when far away from a stop and outside) and audible or other indoor navigation functions near the public transport stop points.

   A device of class b should also support the functionality of a device of class a, and devices of class c should also support the functionality of a device of classes a and b.

   The devices in class c may need to be considered in a subsequent part of a Technical Specification, following collaborative work with the International GDF Standards Group to allow the description of geographic paths (for guidance through the pedestrian network) which is expected to be included in the part 2 of the IFOPT Technical Specification. The devices should be able to communicate with a travel information system if the infrastructure has implemented interfaces and protocols for the relevant end-user devices.

— The fixed infrastructure objects (ticket machines, passenger information facilities, stops, and some other objects defined in the IFOPT Technical Specification) and on-board audio systems provide audible guidance to the VIP (advising which direction in which the VIP has to walk). Communication between the end-user device and the "vehicle control and information system" should allow the VIP system user to remotely control the following :

1) Open unblocked doors and, for slowly moving people, prevent the doors from closing too early.

2) Inside the vehicle, request a stop at the next stop point.

3) Outside the vehicle, request line and destination information from the "vehicle control and information system".

4) Inside the vehicle, get information about the next stops and complementary information (for example "terminus"; "stops only on request"; "change to underground"; "change of tariff zone").

— Short-range wireless communication using Short Range Command Radio or Wireless LAN or similar protocols should exist between the VIP's device and the vehicle or infrastructure.

— Communication between the back office systems and at-stop systems is not considered in this report.

— Communication between the back-office systems and the on-board systems depend on the radio network type that is in use. The messages used in AVMS (Automatic Vehicle Monitoring Systems) can be used. The work on standards and Technical Specifications for VIP may identify additional information elements that usefully can be added to the existing messages. The information on-board the vehicle comes from the databases in the on-board computer and the AVMS. Transmission of the data to the passenger information device is achieved by means of the vehicle data bus, for example CAN Open, World FIP or Industrial Ethernet. The older vehicle data bus IBIS, which operates in many countries, can also be used with certain restrictions for these purposes.

— The requirement for an additional interface between the on-board VIP communication device and the on-board computer is determined by the specific vehicle data bus and the specific on-board VIP communication device that are used. When the vehicle data bus and VIP communication device have the same interface an additional interface is not needed. The same applies to the stop/station passenger information systems. In new vehicles the VIP communication device may be part of the on-board computer or passenger information system, and the same will apply to any new stop/station passenger information systems.

Any Technical Specification in this area should be an open formulation that allows different technologies to be used for specific components, for example short-range Radio, Wi-Fi, Bluetooth, RFID etc, could all be used for short-range wireless communication as long as they meet the requirements. The Specification should not be constrained to specific implementation technologies.

There are some aspects for standardisation that are abstract and apply across different layers and use cases. For example:

— Ergonomic presentation standards for communication with the VIP. There are well known considerations for auditory usability such as pitch, attack, volume of signal, duration, reaction time, the required response time for safety (for example, communication ideally needs to happen in less than three seconds). These requirements are independent of specific technologies and are derived from human perceptual psychology. Relevant standards in this area should be taken into account in systems designs. The user functions that should be supported are, for example: to help a user to locate a stop; to discover the stop name; to obtain information about next stop; to learn about next departures, to make a request to board the vehicle. Certain of these functions are essential and should be mandatory.

— The information content and data elements that need to be transmitted. For example: the line name, stop name, direction/destination (end of the trip) etc. These correspond to elements already defined in public transport information models, such as Transmodel (Reference Data Model for Public Transport). Different formats may be needed to transmit elements in short-range wireless communication, and the work on Standards for VIP may identify additional information elements that can usefully be added to the existing models.

0.2 Short definition of relevant Technical Specifications and standards

— The basic one is Transmodel along with its related Technical Specifications for implementation and enhanced modelling. EN 12896 is the Reference Data Model for Public Transport (called also Transmodel) that defines a conceptual data model for the main domains of public transport (network topology, scheduling, rostering, operations control, passenger information, fare collection, management information & statistics). The current standard is Transmodel v5.1;

— IFOPT (Identification of Fixed Objects for Public Transport) is a complementary data model to Transmodel V5.1. It describes in particular stop places and their components (entrances, equipment, path links, etc.) in detail together with their accessibility properties and constraints. It complements and extends Transmodel;

— As regards data exchange messages, the set of SIRI Technical Specifications provides a set for some basic services (real time timetables, interchanges, etc). This specification relies on the concepts defined by Transmodel V5.1 and is dedicated to data exchange between systems;

— The NeTEx (Network and Timetable Exchange) Technical Specification currently under development will also be relevant;

— All systems should be designed for multi-lingual support of different Natural Languages.

— A Technical Specification should consider existing best practices for assisting, training and guiding VIP.

— The VIP will need to be made aware of available travel information systems in unfamiliar environments.

A Technical Specification should set out use cases and scenarios for interaction between VIP users and at-stop and on-board systems. These should take into account the differences between transport modes, for example buses, trams, local trains, intercity trains, etc. They should also consider the use of training and support services. These use cases should be developed in consultation with organisations for the blind and visually impaired, e.g. European Blind Union.

Acceptability of the VIP information system by other passengers and its potential for disturbance of other passengers should be checked and evaluated.

The approach should be system-oriented, expressed in terms of information layers, interfaces and models and allowing alternative implementations.

The Technical Specification should allow for inevitable differences in the use of radio frequencies in different countries.

The Specification should seek to identify the critical interfaces and harmonisation of technologies that will allow the same device to be used in as many different regions and countries as possible. This would enable the VIP to ‘roam’ with a single device in different regions. To achieve this may require collaboration with ETSI, and/or other CEN or ISO groups.

The capture of the necessary information about the physical environment represents a major practical challenge since there are hundreds of thousands of bus stops in a typical European country and an even larger amount of data about the detailed environment and journeys. It will be important to identify sources and processes for capturing and maintaining this data in order to make it economically viable to provide travel information systems with the capabilities needed for VIPs.

This Technical Report is based on work undertaken mainly between 2006 and 2009 which was seeking to establish the basis for a Technical Specification for work in this area. Whilst it was not possible to secure the support needed across CEN to take the Technical Specification forward in 2009, it was felt to be important that the work undertaken to date should be captured in this Technical Report. It is hoped that this Report will influence developments in this area so that they work well with established standards and specifications for public transport information systems. At some time in the future, when circumstances permit, it is still anticipated that a Technical Specification will need to be created. When that time comes, it should be possible for that work to take advantage of the work to date, as reflected in this Report.

1 Scope

This Technical Report is based on work undertaken to define the scope for a possible Technical Specification that would specify the information needed by blind and visually impaired people (VIP) when they are travelling. This information is primarily intended for users of road-based transport like buses, trolleybuses and trams, but it can also be used for subway, regional and inter-city trains.

The Technical Specification that is suggested would aim to define the contents of the information required at an urban or regional level. Its goal would be to make consistent information for VIP who are travelling anywhere in Europe. It would define the nature and the structure of the information for VIP using public transport to make it familiar, homogeneous and consistent.

The Technical Specification would be applicable to organisations and operators of facilities for Public Transport and related services, either urban or regional, who want to guarantee “accessibility for all” and comply with local laws and recommendations in that field. The suggested Technical Specification should comply with relevant laws and recommendations throughout European countries.

Such a Technical Specification should define the information and remotely controlled functions that should be available for VIPs at stops, platforms, access areas and inside/outside vehicles. The provision and the updating of the available information would be undertaken by the Public Transport operators or their partners. It would have to be linked with existing information and management systems.

A Technical Specification would identify the contents of the information, the events, the validity time periods and the information which should be offered by different classes of end-user devices.

The Technical Specification would state which information is to be provided by each one of the different classes of end-user devices.

“Traveller information for Visually Impaired People” is defined in a three layer top-down framework:

1. “Contents of the information”: this should be in accordance with relevant standards and other Technical Specifications (Transmodel, IFOPT, SIRI, TPEG, etc.) to achieve consistency of end-user information. All information has to be defined (including events for triggering, devices on which the information is presented and validity time periods). This will be based on use-cases;

2. “Messaging and Dialogues”: this part of the processing would have to comply with existing standards and Technical Specifications SIRI, TPEG, etc. to allow interoperability;

3. “Hardware or physical media”: this would define how to implement the messaging system specified above with different technical solutions to assure delivery of traveller information to the end-user. This could include collaboration with ETSI (layer for radio-communication).

The work to develop such a Technical Specification may identify additional information elements that need to be added to existing standards and Technical Specifications.

It is suggested that the first part of the Technical Specification should encompass only the first upper layer “Contents of the information” – and it is on this layer that this report concentrates.

A trip from one location to another location, often described as “door to door” (PLACE to PLACE), of a VIP involves going through several steps and phases (using various transport modes). The Technical Specification would define the information linked to each step and area crossed during a trip of a VIP. It would also define the information supply-chain for the VIP’s traveller information and the updates needed. It would have to be based on the elements and objects which are described in Transmodel and/or IFOPT.

The Technical Specification would need to take into account:

— the various transport modes used during a PLACE to PLACE trip,

— the information needed at each step in the PLACE to PLACE trip,

— the different classes of end-user devices,

— the constraints on the information layer imposed by the messaging layer,

— the constraints on the information layer imposed by the hardware or physical media layer, and

— glossary with all reference keywords needed for multilanguage support (XML tags).

The Technical Specification would need mainly to define:

— use-cases for end-users which will demonstrate the information needed (as line number, destination, name of next stop, etc.) and the associated real-time constraints,

— the nature of the information needed at each step of the PLACE to PLACE trip which may depend on the type of transport used,

— the real-time constraints of the information which depend on its nature and its usage,

— the different kinds of information available (different levels of service) which depend on the different classes of end-user devices, and

— the relationships between this information framework (intended for VIP travellers on public transport), and other information systems for VIP (traffic light, indoor navigation, etc) will have to be clarified.

The first part of the suggested Technical Specification would not define the two lower layers of the framework (Messaging and Hardware/physical media) that would need to be considered in a subsequent part of a Technical Specification, as

— acoustic announcement system;

— acoustic passenger and driver information system;

— automatic vehicle monitoring system;

— digital acoustic announcer;

— Integrated Board Information System (IBIS);

— the technical means which are specified for communication between the information system and the user;

— the information needed by VIP in fields other than public transport usage;

but it would have to take into consideration the developments which are being undertaken to meet other needs of VIP.

2 Use cases - Scenarios

2.1 General

A use case is a collection of possible sequences of interactions between the system under discussion (Traveller information for Visually Impaired People) and its actors (VIP, Public transport Information and Control System), relating to a particular goal. The collection of Use Cases defines all system behaviours relevant to the actors to ensure that their goals will be carried out properly. Any system behaviour that is irrelevant to the actors shall not be included in the use cases.

It is necessary to complete the description of use cases with the following parameters:

a) goal – specifies what the goal of the use case is;

b) actor – specifies who or what initiates the actions;

c) triggering – specifies how the information providing is initiated;

d) information source / expected action;

e) mandatory / optional – specifies if processing of this use case is:

— mandatory, or

— optional.

2.2 Journey preparation

2.2.1 Set the limiting conditions of the journey (A)

The VIP shall be able to set restrictions which need to be considered in searching for the ideal journey pattern. This Use Case is not considered for the first part of the suggested TS but would be required in a subsequent part.

2.2.2 Searching for the optimum journey (B)

The traveller wishes to get from a start PLACE (address or point of interest POI) to a destination PLACE (address or POI). The A.3.4 Intermodal **Journey Planner** (IJP) shall find the ideal trip on the basis of the given conditions. The IJP shall be accessible on both a stationary and a mobile basis. The methods of selecting a trip proposal in response to a trip optimisation query use a combination of criteria, often expressed as a part of the query to Passenger Information Systems and A.3.4 Intermodal **Journey Planner** Systems, for instance:

— minimise the duration or distance of the whole trip;

— prefer one transport mode (bus, metro…);

— minimise the walking distance;

— minimise the number of interchanges;

— minimise the fare;

— prefer a particular OPERATOR;

— apply constraints relevant to the needs of the VIP.

The TRIP PATTERN from a PLACE to a PLACE (so door to door) is the answer to the PASSENGER QUERY (type TRIP OPTIMIZATION QUERY). All the components are there to describe this TRIP PATTERN (ACCESS LINK, PT TRIP which is a sequence of RIDEs and CONNECTION LINKs, etc)

Not yet described are the geographic paths (for guidance through the road network) which will be based on the concepts in IFOPT.

This Use Case is also not proposed for the first part of the suggested Technical Specification but would be included in a subsequent part.

2.2.3 TRIP details (C/C1)

An A.3.4 Intermodal **Journey Planner** supplies a detailed description of the journey from the start PLACE to the destination PLACE, preferably in the form of a NAVIGATION PATH to the boarding stop, parts of SERVICE JOURNEY PATTERN, NAVIGATION PATHs for the interchanges and from the disembarkation PT stop (PLACE) to the destination PLACE (address or POINT OF INTEREST).

2.2.4 Buying a ticket (D)

This function has not been considered at this stage.

2.2.5 On-trip information (E)

On the basis of the data of the planned trip, the “on-trip information” has to be reduced to the information that is relevant to the specific part of the trip.

2.3 Guidance to the access point of PT

2.3.1 Walking to the access point (F)

The pedestrian navigation function informs the VIP in cases of a direction or route path that cannot be followed. In such cases (such as a barrier) the device will calculate a rerouting (it will typically request this information from an IJP). If the new NAVIGATION PATH to the boarding STOP POINT (BOARDING POSITION) takes more time then the available time to reach the PT the device will ask the IJP for a new proposal to reach the destination PLACE (address or POI).

2.3.2 Finding the access point (G)

The access point (STOP PLACE ENTRANCE or BOARDING POSITION) shall be easy to find. Local detail is necessary for precise navigation.

Stops may be of various types from the simplest one which is only a stop post with a static timetable and static sign (or even one without any sign or timetable), through a stop with a shelter and a dynamic stop information system, or a stop in a bus station with several stop places, through to a railway station with one or more entrances.

2.3.3 Confirming that the VIP is at the correct access point (H)

Name of the stop (COMMON NAME) and the access point (STOP PLACE ENTRANCE or BOARDING POSITION), the platforms/stop points (QUAYS) that can be accessed from here and possibly the mode of transport (TRANSPORT MODE), served routes (LINES) and direction (DESTINATION DISPLAY), if both directions are not served. This geographical information may also include details of the location of toilets, kiosks, info points, meeting points etc. (STOP PLACE COMPONENTS)

2.3.4 Topology information for the stop/station (I)

At the access point the VIP shall be provided with the necessary geographic description of the stop or interchange (STOP PATH LINKS), if this has not already been included in the trip planning. If it has already been included in the trip planning, any temporary or valid additions or corrections could be supplied at this point (updates to the STOP PATH LINKS and the STOP PLACE COMPONENTS: lift out of order, freshly painted, access blocked etc.)

This geographical information could also include details of the location of toilets, kiosks, info points, meeting points etc. (STOP PLACE COMPONENTS)

2.3.5 Information about the services provided at the current interchange (J)

Which platform (QUAY or BOARDING POSITION) does my train/bus/tram (VEHICLE) depart from? Information on the transport services (SERVICE JOURNEYS) provided at this stop/interchange shall be available. There shall be a means of clearly communicating any changes to the designated stop point (BOARDING POSITION or STOP POINT) or breakdown of a vehicle (a SERVICE JOURNEY which is not operating).

2.4 Selection of the desired route/direction and path to the departure stop point/platform

2.4.1 Selection of route and direction in the case of a spontaneous journey (K)

The way in which a VIP acquires transport information will differ for different stop/station types.

The VIP shall have an access to current information, such as that available on some of the systems providing Non-interactive Dynamic Passenger Information on Ground. This passenger information device indicates which platform (QUAY) or stop point (BOARDING POSITION or STOP POINT) the desired VEHICLE is departing from.

This poses the question of how a trip can be identified. Today there are various solutions, including planned departure time, route identifier (number) (if provided) and direction; but in this there are various concepts and many routes with more than two destinations as well as the problem of different routes with the same destination.

2.4.2 Information on trains that are split on route (L)

The VIP needs to be informed at some of the displays of Non interactive Dynamic Passenger Information on Ground, and also via the platform displays, that his train splits on route and then ensure he is sitting in the right section of the train. This may be a functionality of the IJP and of the VEHICLE VIP information system.

2.4.3 Walking from the ENTRANCE to the BOARDING POSITION (M)

The VIP shall be guided from the ENTRANCE (e.g. STOP PLACE ENTRANCE) to the departure point (BOARDING POSITION). The system takes into consideration the information from the IJP or the selection at the ENTRANCE (e.g. STOP PLACE ENTRANCE). There will be various decision points along this path (NAVIGATION PATH): junctions (PATH JUNCTIONS), lifts, escalators, ramps, stairs etc. (CHECKPOINTS) at which he shall choose the right path. However the possibility of the VIP making a mistake or unforeseen obstacles blocking the planned route (NAVIGATION PATH) to the departure platform/stop point cannot be avoided. This means that rerouting shall also be possible.

By way of example, in the walking part of the trip a “class a” user device can be used only for orientation by finding, for example, the entrance, correct escalator and stop point with an audible information system.

2.4.4 Finding the ticket desk, ticket machines, info points (N)

The requirement is the same regardless of whether the VIP is trying to find a manned ticket desk (now rare) or a ticket machine. There are a lot of NAVIGATION PATHS within a STOP PLACE. An indoor navigation system would help to find the different objects at a STOP PLACE.

2.4.5 Confirmation that the VIP has arrived at the correct platform / stop point (R)

This is similar to the situation at the access point (see above). The VIP needs the information relating to the location he has arrived at.

2.4.6 Information about the next departures (R1)

The solution is the same as in earlier paragraphs which relate to similar information requirements.

2.5 Waiting for the right vehicle at the stop point / platform, getting on and finding a seat

2.5.1 Identification of the correct vehicle and advice on any special features of the vehicle (S)

The correct vehicle shall be identified at the platform/stop point. Preferably via an acknowledgement from the tram/bus/train (VEHICLE) in response to a wireless request from the VIP (generated automatically for a pre-arranged journey)

Special cases:

— two trains on the same platform;

— double and multiple stops (BOARDING POSITION) for trams/buses (with random positions);

— splitting trains .

Other special cases might include, for example, “closed cars” or “reserved cars”.

There are still many stations/stops without displays on the platform. Where this applies, it could be better if the information is sent directly from the train cars. In the tram/bus field it is essential that the vehicle itself transmits the information.

2.5.2 Information at the stop stating whether the vehicle only stops on request (T)

If the VIP at the stop has to request whether or not the vehicle stops, he shall be informed of the necessity of requesting this when he reaches the platform/stopping point. This may be part of other functions described earlier. This is a property of the stop that shall also be included in the electronic schedule (IJP).

2.5.3 At the stop activate and check “request stop” (U)

This is the process of confirming the requirement for a vehicle to stop at a “request stop”.

2.5.4 Finding the right car (V)

The VIP shall be able to find the right car (VEHICLE) when the service is operated by more than one. This is particularly important for COUPLED JOURNEYs where the train splits along its ROUTE (each part going to different destinations) or if a seat is booked in a particular car. In addition to the prompt to position the VIP in the correct area of the platform (QUAY), detection of the correct car (VEHICLE) (VEHICLE REGISTRATION NUMBER) is also important. Searching for the wagon with the reserved seat once the train has already departed shall be avoided. When dealing with buses/trams there is also the challenge that more than one vehicle can be standing at a stopping point (QUAY) at any one time (see an earlier Use Case)

2.5.5 Finding the right class (first/standard), and restaurant car (W)

Being in the correct car it is still necessary to be able to find the right class within a car.

2.5.6 Opening the door by the VIP if the door is opening by pressing the button(X)

The VIP shall be able to open the door in some way. The method of opening is dependent on the end user's device. If this service is not installed on the vehicle, then having to find and press a button on the vehicle.

2.5.7 Find entrance to upper deck (X1)

For safety reasons this functionality is not recommended for VIP.

2.5.8 Information on access to the vehicle (Y)

At the request of the VIP the VEHICLE or TRAIN ELEMENT shall be able to inform him of the details of an entrance (example: 3 steps, low floor access, etc). This information is a combination of the properties of the VEHICLE or TRAIN ELEMENT and the stop point.

In considering this use case, it shall be remembered that there are many vehicles with different entrance configurations at each door and there are stopping points that do not have the same conditions at all locations (e.g. only part of the platform edge is high enough).

2.5.9 Finding the right seat (AA)

If a seat has been reserved for the journey, the VIP shall be able to find it. It shall not be forgotten, however, that there are double-decker buses and cars. Therefore, information concerning which deck the seat is on is also necessary.

2.5.10 Finding a free seat (AB)

Although this function would be desirable, there is no established mechanism for it to be achieved; accordingly it is unlikely that this functionality will be supported by VIP devices.

2.5.11 Finding the toilet in the train and recognising “occupied” and “out of order” statuses (AC)

Vehicle Board Information and Control System shall be able to provide the necessary information.

2.5.12 Using the toilet in the train or at the stop (AD)

Interaction for using the various functions (flushing, sink water, hand dryer). Operation by means of the personal device is preferable due to hygiene reasons but achieving this will require significant collaboration on standards with vehicle manufacturers and operators.

2.5.13 The VIP wants confirmation that he is in the right vehicle (AE)

Vehicle Board Information and Control System shall be able to provide this information.

2.6 Travelling in public transport vehicles to an interchange stop/station or the final destination

2.6.1 When and where will the vehicle arrive at an interchange stop/station (AF)

The VIP wishes to know in sufficient time when the vehicle is approaching the exit stop/platform so that the VIP can prepare to get off the vehicle/train. The VIP needs to be informed if the stop point/platform is different from the scheduled one.

The announcement of the next stop (eg: the next 3 stops and the destination stop) may be helpful. If the approximate journey time to every stop is added, so much the better. The current deviation from schedule shall be available to the VIP. The VIP shall also be informed about changed stop positions.

2.6.2 Is the transfer guaranteed (AG)

This information shall be available from the IJP.

2.6.3 If the transfer is not guaranteed, the traveller shall be offered an alternative (AH).

This information shall also be available from the IJP.

2.7 Preparing to get off the vehicle/train at an interchange stop/station or at the final destination

2.7.1 Request a stop in a vehicle (AI)

The VIP shall know whether he has to request a stop when he wishes to disembark and where he can do this. It is reasonable to assume that a disabled passenger shall always request a stop. However, confirmation that the request has been registered is very important.

2.7.2 From which side of the vehicle does the VIP get out (AJ)

This information is relevant in trains, cable cars and ships, and crucial if it is not possible to guarantee that only doors on the correct side are opened. The information is also required if the correct side is not opened when the traveller presses the “door open” button on the wrong side or if both sides are always opened. (This is important where this function as well as pre-registration is not permitted).

2.7.3 Opening the door by the VIP inside the vehicle if the door is opened by pressing the button (AK)

The VIP shall be able to open the door in a way other than pressing the button inside the vehicle.

2.7.4 Information about the disembarkation conditions (AL)

It would be ideal if all disembarkation conditions other than those at floor level (low floor to the exact height of the platform) were to be advised – number of steps, height of last step to platform, help step on the platform. This information is a combination of the properties of the VEHICLE or TRAIN ELEMENT and the stop point. However, in view of the danger of accidents, it is better to give no information than the wrong information.

2.8 Finding the next vehicle or the exit from the station

2.8.1 Information concerning which platform/sector the passenger has got off at (AM)

Every disembarkation point is also an access point for the corresponding stop, as the VIP needs to know how he can find his transfer stop point / platform. Because platforms are typically very long, it would be useful if the sectors (BOARDING POSITIONS) of a platform could be made known.

2.8.2 Information about the next vehicle (AN)

It may be necessary to retrieve this information from the IJP, which could be problematic where the transfer times are tight. It would be better if the VIP could receive the information at the disembarkation point. The information on a Stop Information System or on other Dynamic Passenger Information Systems shall update automatically. The VIP would receive this information in the form of an acoustic announcement on request from the user device. The user shall be able to make a selection.

2.8.3 Guidance to the next departure stop point / platform

The VIP shall know the direction in which the next departure point lies. Information is also required on unusual situations within the stop. It is difficult for VIP to guarantee that they are walking off in the right direction.

2.8.4 Guidance to the correct access point (AP)

Guidance is required to the correct access point (here used as an exit), in order to be able to manage the trip from the BOARDING POSITION to the target address/POI (PLACE). Here the problem of direction is particularly important. It is difficult for the VIP to guarantee that they are walking off in the right direction. Here too the system shall detect if the wrong direction is taken (rerouting function). This may be handled with the functions defined in relation to finding a new departure stop point / platform (above).

2.8.5 Calling for transfer assistance

To some extent passengers with disabilities may have the possibility to pre-order transfer assistance via a specialist control centre. This however does not always work under unusual conditions or out of normal business hours. Offering this on site would be too late. Providing information to allow such control centres to be contacted, through information from the IJP, is at least one possible way of addressing this issue.

2.9 Service messages, alternative journeys

2.9.1 General requirement

Deviations from the planned route or schedule need to be easily recognisable as such and communicated.

2.9.2 Delay service message (AR)

A delay can affect several parts of a journey; it may also prove necessary to execute re-routing. Real time journey information is not primarily a problem specific to disabled passengers.

2.9.3 Service message “interrupted route” (AS)

This demands re-routing.

2.9.4 Replacement train (AS1)

Information about a replacement train shall be available to the VIP on request from the user device to the dynamic stop information systems and real time IJP systems.

2.9.5 VIP shall be able to draw attention to themselves (AS2)

Signal to the driver where relevant.

2.9.6 New journey info from the current location (AU)

In case of interruption to the journey sequence, it would be useful for a traveller to be able to get new information as easily as possible. In the ideal situation the personal device would always know exactly where the VIP was located and his destination. With this information a new journey plan could be requested.

2.9.7 Electronically escorted journey (AV)

In the ideal situation the system would automatically suggest a new journey to the traveller, when it establishes that the planned journey cannot be completed.

2.9.8 Problem on the footpath (AX)

This demands rerouting of a NAVIGATION PATH.

2.9.9 General service message to the network (AY)

This requires parallel visual and audible communication. All dynamic stop information systems shall actively communicate with all VIPs' communication devices.

2.9.10 General service message to interchange (AZ)

This requires parallel visual and audible communication. Existing dynamic stop information systems shall actively communicate with all VIPs' communication devices.

2.9.11 General service message to a line (BA)

This requires parallel visual and audible communication. Existing dynamic stop information systems shall actively communicate with all VIPs' communication devices.

2.9.12 General service message to vehicle journey (BB)

This requires parallel visual and audible communication. Existing dynamic stop information systems shall actively communicate with all VIPs' communication devices.

3 Use cases – Forms of solutions

The content of this clause of the report provides a commentary on possible practical solutions to the Use Case scenarios described in Clause 2. It is considered that these can be implemented in practice with the communication technologies and devices which are currently available and in use.

The potential solutions for the use cases are presented in the following tables.

The individual tasks before the arrival of the vehicle at the stop, which the VIP can solve by class a and class b user devices, are briefly described in Table 1. Solutions which are described here are the realisations of scenarios described in 2.4.1, 2.4.5 and 2.4.6, in limited form and also in 2.3.2 and 2.3.3.

Table 1 — Use cases which the VIP can solve by the aid of user devices of class a and b before the arrival of the vehicle at the stop *(1 of 2)*

N°	Name	Actor	Goal	Triggering	Announcement source / expected action	Mandatory Optional
1.	Finding an entrance to the public transport station	Visually impaired person	Switching on the acoustic beacon above the entrance.	Switching on the beacon is triggered by pressing the appropriate key on the end-user device class a, which initiates sending a radio command.	The loudspeaker set above the entrance	M
2.	Finding an entrance to the public transport station	Visually impaired person	Switching on the acoustic beacon above the entrance.	Switching on the beacon is triggered by pressing the appropriate key on the end-user device class b, which initiates sending a radio command.	The loudspeaker set above the entrance	M
3.	Announcement of escalator direction of running	Visually impaired person	Information about the escalator direction of running forms the content of the announcement	The announcement is triggered by pressing the appropriate key on the command transmitter (end-user device class a) which initiates sending a radio command.	The loudspeaker set by the entry to escalators	O

Table 1 — Use cases which the VIP can solve by the aid of user devices of class a and b before the arrival of the vehicle at the stop *(2 of 2)*

N°	Name	Actor	Goal	Triggering	Announcement source / expected action	Mandatory Optional
4.	Announcement of escalator direction of running	Visually impaired person	Information about the escalator direction of running forms the content of the announcement	The announcement is triggered by pressing the appropriate key on the command transmitter (end-user device class b) which initiates sending a radio command.	The loudspeaker set by the entry to escalators	O
5.	Information point or kiosk recognition.	Visually impaired person	The information about the name of the type of information point and possible further servicing.	The announcement is triggered by pressing the appropriate key on the end-user device “class a” which initiates sending a radio command.	The loud-speaker set of the information point or kiosk.	O
6.	Stop recogni-tion	Visually impaired person	The information about the name of the actual stop forms the contents of the announcement.	The announcement is triggered by pressing the appropriate key on the end-user device class a which initiates sending a radio command.	The loudspeaker set of the stop information system.	M
7.	Stop recogni-tion	Visually impaired person	The information about the name of the actual stop forms the contents of the announcement.	The announcement is triggered by pressing the appropriate key on the end-user device class b which initiates sending a radio command.	The loudspeaker of the end user device of class b. The announcement is in the mother tongue.	M
8.	Contents of stop sign	Visually impaired person	The contents of the stop sign form the announcement	The announcement is triggered by pressing the appropriate key on the end-user device class a which initiates sending a radio command.	The loudspeaker set of the stop information system.	M
9.	Contents of stop sign	Visually impaired person	The contents of the stop sign form the announcement	The announcement is triggered by pressing the appropriate key on the end-user device class b which initiates sending a radio command.	The loudspeaker of the end user device of class b. The announcement is in the mother tongue.	M

NOTE The appropriate key means that the specification of the keys will be in the Technical Specification for the end-user device.

The individual tasks after the arrival of the vehicle at the stop, which the VIP can solve by the class a and class b user devices are briefly described in the Table 2. A practical solutions which is described here, is the realisation of scenarios described in 2.5.1 and 2.5.13.

Table 2 — Use cases which the VIP can solve by the aid of user devices of class a and b after the arrival of the vehicle at the stop and en-route *(1 of 3)*

N°	Name	Actor	Goal	Triggering	Announcement source / expected action	Mandatory Optional	Re-mark
1.	Vehicle line number and terminus	Visually impaired person	The information about the number of the actual line and the name of the terminus form the contents of the announcement.	The announcement is triggered by pressing the appropriate key on the command transmitter (end-user device “class a”), which initiates sending a radio command.	The external loudspeaker is located by the door of the vehicle, by which visually impaired persons get on the vehicle.	M	
2.	Vehicle line number and terminus	Visually impaired person	The information about the number of the actual line and the name of the terminus form the contents of the announcement.	The announcement is triggered by pressing the appropriate key on the command transmitter (end-user device “class b"), which initiates sending a radio command.	The loudspeaker of the end user device of class b. The announcement is in the mother tongue. Simultaneously sounds acoustic signal from the door of the vehicle, by which visually impaired persons get on the vehicle.	M	
3.	Confirmation of VIP getting on	Visually impaired person	The driver receives a vocal warning that the VIP wants to get on	The announcement is triggered by pressing the appropriate key on end-user device of class a, which initiates sending a radio command.	The driver’s loudspeaker	M	

Table 2 — Use cases which the VIP can solve by the aid of user devices of class a and b after the arrival of the vehicle at the stop and en-route *(2 of 3)*

N°	Name	Actor	Goal	Triggering	Announcement source / expected action	Mandatory Optional	Re-mark
4.	Confirmation of VIP getting on	Visually impaired person	The driver receives a vocal warning that the VIP wants to get on	The announcement is triggered by pressing the appropriate key on the end-user device of class b, which initiates sending a radio command.	The driver's loudspeaker	M	
5.	Actual stop	Vehicle Board Information and Control System VBICS	Announcement of the name of the actual stop and complementary information for passengers.	The announcement is triggered by the VBICS automatically or with the participation of the driver	Vehicle on-board loudspeakers or the loudspeaker of the end user device of class b. The announcement is in the local language.	M	#
6.	Next stop	Vehicle Board Information and Control System VBICS	Announcement of the name of the next stop and complementary information for passengers	The announcement is triggered by the VBICS automatically or with the participation of the driver	Vehicle on-board loudspeakers or the loudspeaker of the end user device of class b. The announcement is in the local language.	M	#
7.	Actual stop and next stop	Vehicle Board Information and Control System VBICS	Announcement of the names of the actual and next stops and complementary information for passengers	The announcement is triggered by the VBICS automatically or with the participation of the driver	Vehicle on-board loudspeakers or the loudspeaker of the end user device of class b. The announcement is in the local language.	M	#

Table 2 — Use cases which the VIP can solve by the aid of user devices of class a and b after the arrival of the vehicle at the stop and en-route *(3 of 3)*

N°	Name	Actor	Goal	Triggering	Announcement source / expected action	Mandatory Optional	Re-mark
8.	Terminus	Vehicle Board Information and Control System VBICS	Announcement of the stop name and complementary information for passengers	The announcement is triggered by the VBICS automatically or with the participation of the driver	Vehicle on-board loudspeakers or the loudspeaker of the end user device of class b. The announcement is in the local language.	M	
9.	Stop request	Visual impaired person	The driver receives specified warning that a passenger wants to get off at the stop “on request”.	The specified advice is triggered by pressing the appropriate key on end-user device of class a or class b, which initiates sending a radio command.	The specified warning for the stop request on the driver’s desk switches on.	O	
10.	Route description	Visual impaired person	Announcement of names of all stops from the next stop unto the terminus	The announcement is triggered by pressing of appropriate key on the end-user device of class b, which initiates sending of a radio command.	Vehicle on-board loudspeakers or the loudspeaker of the end user device of class b. The announcement is in the local language.	O/M	**$**
# These use cases can be used separately or in combination. **$** For the user devices of class b is this announcement mandatory.							

NOTE The appropriate key means that the specification of the keys will be in the TS on the end-user device.

4 Requirements

4.1 Introduction

The announcements which are proposed in the following clauses are only the first of many possible announcements. Most of these announcements in the vehicle are designed for the benefit of all passengers as an integral part of the Vehicle Board Information and Control System.

Further announcements especially for class c user devices will be proposed for adoption in a future part of the suggested Technical Specification.

This clause defines the contents of the announcements for the use cases described in this document, which can be triggered by users of class a or b user devices. The Acoustic Announcement Messages (AAM) are vocal information for passengers or a driver.

4.2 Definitions of announcements

4.2.1 Types of announcement content

4.2.1.1 Definition of a simple phrase

The following definitions are primarily detailed for digital acoustic announcers which have not implemented text to speech conversion.

The announcements can be grouped as shown in Figure 1.

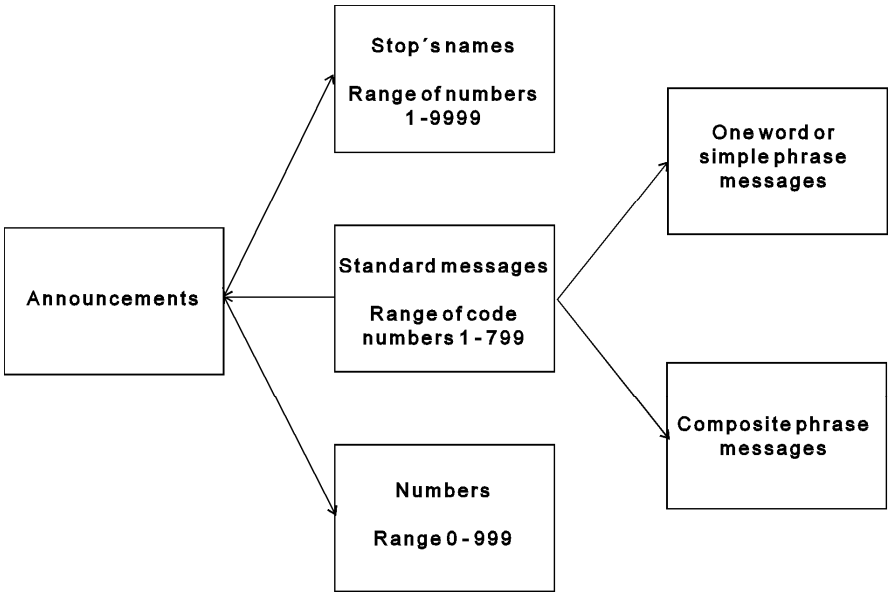

Figure 1 — Types of announcements

4.2.1.2 Definition of a simple phrase

A simple phrase is a connection of a small number of words, which have a specific meaning. For example: “next stop”, “please alight”, “terminus”.

4.2.1.3 Definition of a composite phrase

A composite phrase is a connection of several simple phrases, which presents a specific message. For example: “this is the terminus, please alight here, all change please”.

4.2.1.4 Definition of a chained announcement

A chained announcement is a chain of single announcements. The following entities may form parts of the chain:

a) standard message;

b) numeral;

c) stop name.

4.2.2 AAM directed to on-board loudspeakers

The minimum contents of this AAM will be names of stops and complementary information for passengers.

Two forms of announcement of the stop's name can be used:

a) Announcing stop names consists of the announcements of the current stop name itself and the name of the next stop. The gong or another acoustic signal sounds before the current stop's name. The text “next stop” is inserted before the name of the next stop.

b) Announcement of the current stop and the next stop can also be separate. For example the current stop's name announcement is generated by the opening of the door at the stop and the next stop's name by the closing of the door at the stop.

Complementary information will be inserted after the name of the stop. The complementary information specifies the kind of the stop, for example:

— terminus;

— on request;

— change to underground;

— change of tariff zone.

The message “change to underground” will be announced only when the underground is operating.

The extended contents of an AAM would comprise important information for passengers, describing non-standard operational situations such as service suspension, operational break and so on.

4.2.3 AAM directed to the driver's loudspeaker

The following messages primarily form the content of these AAM:

— coded messages from the control centre of the AVMS to the driver about the operational situation;

— messages about false status of the devices on board the vehicle controlled by the board bus controller;

— warning messages triggered by the VIP about the VIP boarding the vehicle.

4.2.4 AAM directed to external loudspeakers

This type of AAM is primarily designed to meet the needs of visually impaired people. The information about the number of the route and the name of the terminus form the contents of the announcement.

4.2.5 AAM at the stops with a non-interactive dynamic passenger information system

This type of AAM is primarily designed to meet the needs of visually impaired people. The text displayed on the sign of the system forms the contents of the announcement. The text on the sign for particular connections consists of the number of the line and the name of the terminus. The departures of particular connections can be displayed and announced in two forms:

— the time to the departure;

— the time of the scheduled departure in hours and minutes and any expected delay in minutes.

The first form might be used when the time to the departure is less than 60 min. The second one might be used when the time to the departure is more than 60 min.

4.3 Forms of announcements

4.3.1 Announcing of stop names

Announcing of stop names consists of the announcements of the current stop's name itself and the name of the next stop. The gong rings before the name of the stop. The text “next stop” is inserted before the name of the next stop. The digital acoustic announcer can insert the gong and the text “next stop” automatically.

The announcement of current stop and next stop can also be announced separately. If the stop is only “on request” the appropriate message is inserted in the announcement automatically.

4.3.2 Examples of stop name announcements

Examples of stop name announcements triggered by the Vehicle Board Information and Control System:

4.3.2.1 Example of the announcement of the names of the current and next stop

— “(Gong) Central railway station, next stop New bridge.”

4.3.2.2 Example of the announcement of terminus name

— “(Gong) Central railway station, terminus, please alight here.”

4.3.2.3 Example of the announcement of the stop's name with complementary information

— “(Gong) New Bridge. Please note that a road closure means that this service will turn left to stops at Old Bridge, National Theatre, Green Houses and then will continue along its normal route.”

Complementary information is:

— “*Please note that a road closure means that this service will turn left to stops at Old Bridge, NationalTheatre, Green Houses and then will continue along its normal route.*”

4.3.2.4 Example of the announcement of the stop's name with tariff information

— “(Gong) New Bridge, end of tariff zone 0.”

Complementary information is “*end of tariff zone 0*”;

— “(Gong) Next stop Old Bridge, beginning of tariff zone 1.”

Complementary information is “*beginning of tariff zone 1*”.

4.3.2.5 Example of the announcement of the stop's name with information about the direction of alighting

— “(Gong) New Bridge, please alight on the right in the direction of travel.”

Complementary information is “*please alight on the right in the direction of travel*.”;

— “(Gong) Next stop Old Bridge, please alight on the right in the direction of travel.”

Complementary information is “*please alight on the right in the direction of travel*”.

4.3.3 Message triggered by the VIP to external loudspeaker

Example of the message:

— “Line number 253 in the direction of Central railway station.”

4.3.4 Message triggered by the VIP to driver’s loudspeaker

Example of the message:

— “A disabled person wants to get on.”

4.3.5 Examples of the announcement of the Stop Passenger Information System

4.3.5.1 An example of announcement of time to departure

— “Your connections from here are service 148 in the direction to Busseallee, departs in 10 minutes; service 200 in the direction of Zoologische Garten, departs in 11 minutes; service 348 in the direction of Breiterbach Platz, departs in 16 minutes.”

4.3.5.2 An example of the scheduled time of the departure and the delay

— “service 327 in direction of Opatov scheduled at 14:29 is running 5 minutes late; service 332 in direction of Jílové, scheduled at 14:38 is running 20 minutes late; service 332 in direction of Říčany, is scheduled at 14:42.”

Annex A
(informative)

Abbreviations and definitions

A.1 Abbreviations

The following definitions are recommended to apply to any Technical Specification developed in this area, as they link them back to those in other existing standards and specification where available:

Table A.1 — Abbreviations *(1 of 2)*

Abbreviation	Description
AAM	Acoustic Announcement Message is voice information for passengers or a driver.
AAS	Acoustic Announcement System is a Computer controlled system which controls acoustic announcements in a vehicle designed as a part of the Vehicle Board Information and Control System (VBICS). The functions of AAS may be integrated in one device: DAA.
APDIS	Acoustic Passenger and Driver Information System
AVMS	Automatic Vehicle Monitoring System: System equipment on-board the vehicle of road public transportation (buses, trolleybuses and tramways) and the corresponding equipment installed on the ground, which are designed to monitor the location of vehicles operating public transport services and supporting operation aid systems, automatic information systems, fare collection systems, maintenance aid systems.
CAN	Controller Area Network. The CAN data link layer protocol for serial communication as specified in ISO 11898-1. The CAN Open is a CAN-based higher layer protocol. It was developed as a standardised embedded network with highly flexible configuration capabilities.
DAA	Digital Acoustic Announcer is a part of an AAS. DAA is designed to announce the names of stops and messages which are stored in its digital memory. DAA converts the digital data into an analogue audio signal. Parts of AAS are also audio power amplifiers when the DAA is integrated with the functions of AAS.
GPRS	General Packet Radio Service
IBIS	Integrated Board Information System is an on-vehicle information and control system for passengers and drivers. (German Recommendation VDV-300)
IJP	Intermodal Journey Planner
LBS	Location based services
MMI	Man Machine Interface is the part of a device which is stipulated for communication between the system of the device and the user.
OBTB	On-board Transmission Bus enables the control of the AAS by the board controller of the Vehicle Board Information and Control System (VBICS)

Table A.1 — Abbreviations *(2 of 2)*

Abbreviation	Description
PT	Public Transport
RFID	Radio-frequency identification. Radio-frequency identification'" ('"RFID'") is an identification and data capture method, relying on storing and remotely retrieving data using devices called RFID tags or transponders.
SDS	Short Data Service
SMS	Short Message Service. This was originally defined as part of the GSM series of standards in 1985 as a means of sending "short" (160 characters or less) messages, most often text messages, to and from GSM mobiles.
SRCR	Short-Range Command Radio
TR	Technical Report
TS	Technical Specification
VBICS	Vehicle Board Information and Control System are created by all devices installed on-board the vehicle, which are controlled by the board computer (controller).
VIP	Visually Impaired (Handicapped) Person or People
Wi-Fi	Wireless Fidelity is an alternative term for WLAN.
WLAN	Wireless local area network (WLAN) is the standard specified in the IEEE 802.11.

A.2 Definitions (Data elements)

The following definitions are applied to this Technical Report:

Items marked in Yellow are new terms proposed for use in the suggested Technical Standard for TI-VIP, as additions to terms in IFOPT or Transmodel.

A.2.1 ABSTRACT STOP PLACE SPACE – IFOPT

An ABSTRACT STOP PLACE SPACE is an ACCESS SPACE, a BOARDING POSITION or a QUAY.

A.2.2 ACCESS LINK – Transmodel

The physical (spatial) possibility for a PASSENGER to access or leave the PT system. This link may be used during a trip for:

— The walking movement of a passenger from a PLACE (origin of the trip) to a STOP POINT (origin of the PT TRIP), ie: the BOARDING POINT for the first used PT vehicle), or

— The walking movement from a STOP POINT (destination of the PT TRIP, ie: the last BOARDING POINT for the last used PT vehicle) to a PLACE (destination of the trip).

In IFOPT, a STOP PLACE, an ADDRESS, a POINT OF INTEREST, PARKING and a TOPOGRAPHICAL PLACE are all types of PLACE and so an ACCESS LINK may also explicitly connect them.

A.2.3 ACCESS PATH LINK – IFOPT

A type of external PATH LINK connecting a PLACE with another PLACE. A sequence of ACCESS PATH LINKs may project onto an ACCESS LINK.

Each end of an ACCESS PATH LINK connects to an entity that is a concrete subtype of PLACE, for example STOP PLACE, POINT OF INTEREST, ADDRESS, ROAD ADDRESS, QUAY, etc that is an ACCESSIBLE PLACE. Each end of an ACCESS PATH LINK may further have a specific ENTRANCE of the same concrete subtype of PLACE associated with that end, that is, STOP PLACE ENTRANCE, QUAY ENTRANCE, POINT OF INTEREST ENTRANCE, etc. to indicate the exact entrance to the building.

Inside a physical STOP PLACE, STOP PATH LINKs should be used instead of ACCESS PATH LINKs.

A.2.4 ACCESS SPACE – IFOPT

A passenger area within a STOP PLACE such as a concourse or booking hall, immigration hall or security area that is accessible by passengers, but without a direct access to vehicles. Direct access to a VEHICLE is always from a QUAY and/or BOARDING POSITION. An ACCESS SPACE may be a Room, Hall, Concourse, Corridor, or bounded open space within a STOP PLACE.

A.2.5 ACCESS SPACE ENTRANCE – IFOPT

An entrance or exit for PASSENGERs to or from an ACCESS SPACE.

An ACCESS SPACE ENTRANCE may be internal, giving access to another ACCESS SPACE or QUAY, in which case it connects to some other part of the same STOP PLACE; or External, representing a point of attachment through which to navigate a route to the STOP PLACE.

A.2.6 ACCESSIBILITY – IFOPT

The possibility of a user with a specific USER NEED, such as a disability or encumbrance, to access either fixed or moving Public Transport facilities.

A.2.7 ACCESSIBILITY ASSESSMENT – IFOPT

The ACCESSIBILITY characteristics of an entity used by PASSENGERs such as a STOP PLACE, or a STOP PLACE COMPONENT. Described by ACCESSIBILITY LIMITATIONs and/or a set of SUITABILITIES.

A.2.8 ACCESSIBILITY LIMITATION – IFOPT

A categorisation of the ACCESSIBILITY characteristics of a STOP PLACE COMPONENT such as a STOP PATH LINK, STOP PLACE or ACCESS SPACE to indicate its usability by PASSENGERS with specific needs, for example, those needing wheelchair access, step-free access or wanting to avoid confined spaces such as lifts. A small number of well-defined categories are used that are chosen to allow the consistent capture of data and the efficient computation of routes for different classes of user.

A.2.9 ACCESSIBLE PLACE – IFOPT

A type of PLACE, such as a STOP PLACE, POINT OF INTEREST or ADDRESS, to which PASSENGERs may wish to travel. An ACCESSIBLE PLACE may be the endpoint of a PATH LINK and can have designated entrances that represent the best point of access for different USER NEEDs.

A.2.10 ACCESSIBLE PLACE IN SEQUENCE- IFOPT

A sequence of ACCESSIBLE PLACEs indicating traversal of a particular route. *This definition should be added to IFOPT.*

A.2.11 ADDRESS – IFOPT

The descriptive data associated with a PLACE that can be used to describe the unique geographical context of a PLACE for the purposes of identifying it. May be refined as either a ROAD ADDRESS, a POSTAL ADDRESS or both. An ADDRESS can be associated with a PLACE or POINT OF INTEREST where a PASSENGER's trip can start or end.

A.2.12 BOARDING POSITION – IFOPT

A location within a QUAY from which PASSENGERs may directly board, or onto which PASSENGERs may directly alight from, a VEHICLE.

A.2.13 BOARDING POSITION ENTRANCE – IFOPT

An entrance or exit for PASSENGERs to/from a BOARDING POSITION within a QUAY.

A.2.14 CHECKPOINT – IFOPT

The characteristics of a STOP PLACE COMPONENT representing a process, such as check-in, security screening, ticket control or immigration, that may potentially incur a time penalty that needs to be allowed for when journey planning. Used to mark STOP PATH LINKs to determine transit routes through interchanges.

A.2.15 COMMON NAME – IFOPT

The canonical name given to a STOP PLACE, POINT OF INTEREST, or TOPOGRAPHICAL PLACE that will be used on displays and other media to identify a PLACE.

A.2.16 CONNECTION LINK - Transmodel

This represents the physical (spatial) possibility for a passenger to change from one public transport vehicle to another to continue a trip. Different transfer times may be necessary to cover interchange over a given connection link, depending on the kind of passenger.

A.2.17 COUPLED JOURNEY – Transmodel

A complete journey operated by a coupled train, composed of two or more VEHICLE JOURNEYs remaining coupled together all along a JOURNEY PATTERN. A COUPLED JOURNEY may be viewed as a single VEHICLE JOURNEY.

A.2.18 DESTINATION DISPLAY – Transmodel/SIRI

An advertised destination of a specific JOURNEY PATTERN. Name of destination of the SERVICE JOURNEY.

A.2.19 ENTRANCE – IFOPT

An identified point of entry or exit for a PASSENGER to or from a STOP PLACE, ACCESS SPACE or POINT OF INTEREST. It may or may not have a physical manifestation such as a door, barrier, turnstile or other obstacle. The PASSENGER may be on foot, in a wheelchair, on a bicycle or on some other private mode of transport. The ENTRANCE may have a TRANSPORT MODE to indicate the permitted modes. A door may be marked for use for entry, exit or both.

A.2.20 EQUIPMENT PLACE – IFOPT

A STOP PLACE COMPONENT containing equipment associated with other STOP PLACE COMPONENTS or other places accessible to PASSENGERS.

A.2.21 INTERCHANGE – Transmodel

The scheduled possibility for transfer of passengers between two SERVICE JOURNEYS at the same or different STOP POINTS.

In order to reach the destination of a trip, a passenger will have to interchange between vehicles running on different LINEs, if there is no direct service between the origin and the destination STOP POINTS. A transfer will be necessary where the passenger will leave the vehicle at a particular STOP POINT and enter another vehicle (which serves another JOURNEY PATTERN, usually on a different LINE, at the same or another STOP POINT). Such interchanges may be planned and even sometimes guaranteed. They are therefore controlled during operations.

A.2.22 JOURNEY PATTERN – Transmodel

An ordered list of STOP POINTS and TIMING POINTS on a single ROUTE, describing the pattern of working for public transport vehicles. A JOURNEY PATTERN may pass through the same POINT more than once. The first POINT of a JOURNEY PATTERN is the origin. The last POINT is the destination.

A.2.23 LEVEL – IFOPT

An identified storey (ground, first, basement, mezzanine, etc) within an interchange building on which STOP PLACE COMPONENTS reside. A STOP PATH LINK may connect components on different levels.

A.2.24 LINE – Transmodel

A group of ROUTES which is generally known to the public by a similar name or number. A LINE is in general operated by only one TRANSPORT MODE: metro line, ferry line, etc.

A.2.25 LINK – Transmodel

An oriented spatial object of dimension 1 with view to the overall description of a network, describing a connection between two POINTS.

A.2.26 LOCATION – Transmodel

The position of a POINT with a reference to a given LOCATING SYSTEM (eg: WGS84 coordinates).

A.2.27 LOCATING SYSTEM – Transmodel

The system used as reference for the location and graphical representation of the network and other spatial objects.

A.2.28 NAVIGATION PATH – IFOPT

A representation of a detailed pathway that a PASSENGER may take between two PLACES within a STOP PLACE, or between STOP PLACE, POINT OF INTEREST, etc. A NAVIGATION PATH can be made up of an ordered set of PATH LINKS IN SEQUENCE, an ordered set of ACCESSIBLE PLACES IN SEQUENCE or both a POINT or a LINK representation may be useful for different applications.

There may be multiple NAVIGATION PATHS between the same STOP PLACE COMPONENTS or other PLACES, reflecting different physical paths and with particular ACCESSIBILITY ASSESSMENTS. NAVIGATION PATHS may be predefined, or be computed dynamically from the underlying set of STOP PLACE COMPONENTS and other PLACE and LINK types.

The same PATH LINK may occur in different sequences in different NAVIGATION PATHS.

A.2.29 NAVIGATION KEYWORD – TI-VIP

NAVIGATION KEYWORDS are all keywords which are necessary to describe a NAVIGATION PATH. These NAVIGATION KEYWORDS correspond to the keywords in the XML schema.

A.2.30 PARKING – IFOPT

Designated locations for leaving vehicles such as cars, motorcycles and bicycles.

A.2.31 PASSENGER – TI-VIP

A PASSENGER is a traveller using public transport.

A.2.32 PASSENGER INFORMATION SYSTEM – IFOPT

PASSENGER INFORMATION SYSTEMs are concerned with:

— Information provision and exchange about the network services (timetables, etc),

— Optimisation of passenger trips (trip proposals made according to specific criteria, etc),

— Management of Public Transport resources (sales points, validators, passenger information devices, etc).

A.2.33 PASSENGER QUERY – Transmodel

A request for specific information on public transport, expressed during a PI TRANSACTION (see Transmodel).

Each PASSENGER QUERY refers to a precise topic and is therefore classified by the entity TYPE OF QUERY (see Transmodel). The main types, modelled as sub-types of PASSENGER QUERY, are:

SCHEDULE QUERY (see Transmodel), for which a potential passenger asks for schedules, departure or passing times on certain lines and stop points;

FARE QUERY (see Transmodel) for information on the fare structure, or on the amount of fare for a particular trip;

TRIP OPTIMIZATION QUERY, for which a passenger asks for the optimum path to follow on the public transport network.

A.2.34 PATH JUNCTION – IFOPT

A designated point, inside or outside a STOP PLACE or POINT OF INTEREST, at which two or more PATH LINKS may connect. This allows ACCESS PATH LINKS to be linked together outside a specific STOP PLACE. Within a STOP PLACE, ACCESS SPACES are usually used as junction points.

A.2.35 PATH LINK – IFOPT

A link between any two STOP PLACES, STOP PLACE SPACES (that is, ACCESS SPACES or QUAYS or BOARDING POSITIONS), POINTS OF INTEREST or PATH JUNCTIONS that represents a step in a possible route for pedestrians, cyclists or other out of vehicle passengers within or between a PLACE.

A STOP PATH LINK is used within a STOP PLACE and may have further properties and attributes derived from its relationship with the STOP PLACE. An ACCESS PATH LINK is used outside a STOP PLACE.

It is possible but not mandatory that a PATH LINK projects onto a more detailed set of infrastructure or mapping links that plot the spatial course, allowing it to be represented on maps and to tracking systems.

A.2.36 PATH LINK IN SEQUENCE – IFOPT

A step of a NAVIGATION PATH indicating traversal of a particular PATH LINK as part of a recommended route.

The same PATH LINK may occur in different sequences in different NAVIGATION PATHS.

A.2.37 PLACE – Transmodel

A PLACE is a geographic location of any type. It may be specified as the origin or destination of a trip. A PLACE may be of dimension 0 (a POINT), 1 (a road section) or 2 (a ZONE).

In IFOPT a PLACE may be of dimension 3 and be further associated with a LEVEL.

A PLACE may be identified by a COMMON NAME, a POSTAL ADDRESS or a POINT OF INTEREST.

A.2.38 POINT – Transmodel

A 0-dimensional node of the network used for the spatial description of the network. POINTS may be located by a LOCATION in a given LOCATING SYSTEM.

A.2.39 POSTAL ADDRESS- IFOPT

The data associated with a PLACE that can be used to describe the geographical context of a PLACE for the purposes of identifying it. The POSTAL ADDRESS refines the ADDRESS and uses the attributes used for conventional identification for mail. Comprises variously a building Identifier, Street name, Postcode and other descriptors.

A.2.40 POINT OF INTEREST – IFOPT

A type of PLACE to or through which passengers may wish to navigate as part of their journey and which is modelled in detail by JOURNEY PLANNERS. A POINT OF INTEREST may further have a complex spatial substructure with constrained POINT OF INTEREST ENTRANCES and access pathways described using ACCESS PATH LINKS. A JOURNEY PLANNER will normally provide an optimised route from a STOP PLACE to a POINT OF INTEREST ENTRANCE using a NAVIGATION PATH comprising one or more PATH LINKS IN SEQUENCE.

A.2.41 POINT OF INTEREST ENTRANCE – IFOPT

A specific located external ENTRANCE to a POINT OF INTEREST. A JOURNEY PLANNER will normally provide an optimised route from a STOP PLACE to a POINT OF INTEREST ENTRANCE as an ACCESS PATH LINK.

A.2.42 PT TRIP – Transmodel

A part of a TRIP starting from the first boarding of a PT vehicle to the last alighting from a PT vehicle. A PT TRIP consists of one or more RIDEs and the movements (usually walks) necessary to cover the corresponding CONNECTION LINKS.

A.2.43 QUAY – IFOPT

A place such as platform, stance, or quayside where PASSENGERS have access to PT vehicles, Taxis or other means of transportation. A QUAY may serve one or more VEHICLE STOPPING PLACES and be associated with one or more STOP POINTS.

A QUAY is a recursive structure that may contain other sub QUAYS. A child QUAY should be physically contained within its parent QUAY.

A.2.44 QUAY ENTRANCE – IFOPT

An entrance or exit for PASSENGERS to/from a QUAY.

A.2.45 RIDE – Transmodel

A part of a trip corresponding to the theoretical movement of a user (PASSENGER, driver) on one and only one public transport vehicle, from one STOP POINT to another, on one JOURNEY PATTERN.

A.2.46 ROAD ADDRESS – IFOPT

The data associated with a PLACE that can be used to describe the geographical context of a PLACE for the purposes of identifying it in terms of the road network. The ROAD ADDRESS refines the ADDRESS of a PLACE located on a road and uses the attributes such as road number, and name used for conventional identification of a road.

A.2.47 ROUTE – Transmodel

An ordered list of located POINTS defining one single path through the road (or rail) network. A ROUTE may pass through the same POINT more than once.

A.2.48 SERVICE JOURNEY – Transmodel

A SERVICE JOURNEY is a VEHICLE JOURNEY on which PASSENGERS will be allowed to board or alight from VEHICLES at STOP PLACES. These journeys are usually published and known by PASSENGERS.

A.2.49 SCHEDULED STOP POINT – IFOPT

A POINT in a journey where PASSENGERs can board or alight from VEHICLES. SCHEDULED STOP POINT refines the primary Transmodel sense of a STOP POINT, which is that of the logical stop point within a scheduled journey, rather than a physical point in the infrastructure where boarding and alighting may take place, for which the terms for specific STOP PLACE COMPONENTS such as QUAY or BOARDING POSITION are used. Although the same identifiers are often used for both SCHEDULED STOP POINT and STOP PLACE COMPONENT, a practice which provides significant benefits for data management, they nonetheless represent distinct concepts. A STOP POINT ASSIGNMENT is used to associate a SCHEDULED STOP POINT with a STOP PLACE COMPONENT.

A.2.50 STOP PATH LINK – IFOPT

A path between any two physical STOP PLACE SPACES within an interchange that represents a step of a possible transfer route for passengers within a STOP PLACE. A STOP PATH LINK is a STOP PLACE COMPONENT in its own right and may have ACCESSIBILITY LIMITATIONS and CHECKPOINTS associated with it to indicate impediments that may prevent access or slow a user down. A sequence of one or more STOP PATH LINKS may make up a NAVIGATION PATH.

Each end of a STOP PATH LINK connects to an entity that is a concrete subtype of an ABSTRACT STOP PLACE SPACE, that is, ACCESS SPACE or QUAY or BOARDING POSITION. Each end of a STOP PATH LINK may further have a specific ENTRANCE of the same concrete subtype of ABSTRACT STOP PLACE SPACE associated with that end, that is QUAY ENTRANCE, ACCESS SPACE ENTRANCE or BOARDING POSITION ENTRANCE.

STOP PATH LINKs may be used only within an interchange. ACCESS PATH LINKS may be used for PATH LINKs outside the physical STOP PLACE.

A.2.51 STOP PLACE – IFOPT

A place comprising one or more locations where vehicles may stop and where passengers may board or leave vehicles or prepare their trip. A STOP PLACE will usually have one or more well known names, of which the preferred one would be defined as its COMMON NAME.

A.2.52 STOP PLACE COMPONENT – IFOPT

An element of a STOP PLACE describing part of its structure. STOP PLACE COMPONENTS share common properties for data management, accessibility and other features.

A.2.53 STOP PLACE ENTRANCE – IFOPT

A physical entrance or exit to/from a STOP PLACE. May be a door, barrier, gate or other recognisable point of access.

A.2.54 STOP PLACE SPACE – IFOPT

A physical area within a STOP PLACE, for example, a QUAY, BOARDING POSITION, ACCESS SPACE or EQUIPMENT PLACE.

A.2.55 STOP POINT – Transmodel / IFOPT

A POINT in a planned journey where PASSENGERs can board or alight from VEHICLES. Renamed in IFOPT to SCHEDULED STOP POINT.

A.2.56 SUITABILITY – IFOPT

Whether a particular facility such as a STOP PLACE COMPONENT or VEHICLE can be used by a PASSENGER with a particular USER NEED.

A.2.57 TOPOGRAPHICAL PLACE – IFOPT

A TOPOGRAPHICAL PLACE represents a geographical settlement which provides topographical context when searching for or presenting travel information, for example as the origin or destination of a trip. It may be of any size (e.g. County, City, Town or Village) and of different specificity e.g. Greater London, London, West End, Westminster, St James's.

A TOPOGRAPHICAL PLACE may be associated with a PLACE (including a STOP PLACE), but not all PLACES are TOPOGRAPHICAL PLACES. TOPOGRAPHICAL PLACES may be organised through hierarchical containment and disjoint adjacency relationships.

A TOPOGRAPHICAL PLACE should always have a canonical gazetteer name. It may be necessary to use the hierarchical topographical relationships of the TOPOGRAPHICAL PLACE to establish a unique context with which to distinguish between two TOPOGRAPHICAL PLACES with the same name.

A.2.58 TRAIN ELEMENT

A TRAIN ELEMENT is an elementary component of a TRAIN (e.g. car, locomotive).

A.2.59 TRANSPORT MODE – Transmodel

A characterisation of the operation according to the means of transport (e.g. bus, tram, metro, train, ferry, ship).

A.2.60 TRIP PATTERN – Transmodel

The spatial pattern of a complete movement of a passenger (or another person, eg driver) from one PLACE of any sort to another. A trip may consist of one PT TRIP and the corresponding movements (usually walks) to cover the necessary ACCESS LINKS and CONNECTION LINKS, or of one walk only.

A.2.61 TRIP OPTIMIZATION QUERY – Transmodel

A TRIP OPTIMIZATION QUERY represents the trip planning request, as specified by the traveller. It is expressed from one PLACE to another.

A.2.62 TRIP PATTERN – Transmodel

The spatial pattern of a complete movement of a PASSENGER (or another person, e.g. driver) from one PLACE of any sort to another. A TRIP may consist of one PT TRIP and the corresponding movements (usually walks) to cover the necessary ACCESS LINKS and CONNECTION LINKS, or of one walk only.

A.2.63 USER NEED – IFOPT

An ACCESSIBILITY requirement of a PASSENGER. For example, that they are unable to use stairs, or lifts, or have visual or auditory impairments.

A.2.64 VEHICLE – Transmodel

A public transport vehicle used for carrying passengers. Also a train is a VEHICLE. A train is composed of TRAIN ELEMENTS (e.g. wagons, locomotive, etc.)

A.2.65 VEHICLE JOURNEY – Transmodel

The planned movement of a public transport vehicle on a DAY TYPE from the start point to the end point of a JOURNEY PATTERN on a specified ROUTE.

A.2.66 VEHICLE REGISTRATION NUMBER

The VEHICLE REGISTRATION NUMBER is an attribute of the element VEHICLE.

A.2.67 VEHICLE STOPPING PLACE – IFOPT

A place on the vehicle trackway where VEHICLES stop in order for PASSENGERS to board or alight from a VEHICLE.

A vehicle trackway is located on the respective INFRASTUCTURE LINK for the MODE (RAILWAY ELEMENT of rail network, ROAD ELEMENT of road network, etc). A VEHICLE STOPPING PLACE may be served by one or more QUAYS.

A.2.68 ZONE – Transmodel

A two-dimensional PLACE within the service area of a public transport operator (administrative zone, TARIFF ZONE, ACCESS ZONE, etc.).

A.3 Definitions (Systems and elements)

A.3.1 Bluetooth

Bluetooth is an industrial specification for wireless personal area networks (PANs). Bluetooth provides a way to connect and exchange information between devices such as user devices and fixed object terminals.

A.3.2 General Packet Radio Service (GPRS)

GPRS (General Packet Radio Service) is the world's most ubiquitous wireless data service, available now with almost every GSM network. GPRS is a connectivity solution based on Internet Protocols that supports a wide range of enterprise and consumer applications. It provides maximal data rates from 56 kbit/s up to 114 kbit/s. The maximal data rate is not guaranteed.

A.3.3 Industrial Ethernet

Industrial Ethernet is the name given to the use of the Ethernet protocol in an industrial environment, for automation and machine control.

A.3.4 Intermodal Journey Planner

An Intermodal Journey Planner (IJP) is a Transport Information System which provides travellers with optimised information to plan their door to door journeys and to support them during their intermodal trip. IJP systems provide timetable, routing and other travel information. An intermodal journey planner covers multiple modes of transport including both public transport (bus, rail, air, tram and underground) and private transport (car journeys, use of footpaths, cycle routes) on the road and path networks. Depending of the timetable of PT different stop points as start and end the PT TRIP may result. (See Transmodel for more information about Passenger trip planning).

A.3.5 Journey Planner

A journey planner will normally provide the nearest points of access to PT for the origin (PLACE) and destination (PLACE) of the trip. It doesn't optimise the whole trip (door to door) (see INTERMODAL JOURNEY PLANNER) but the PT TRIP.

A.3.6 Man Machine Interface

Man Machine Interface is a part of a device which is stipulated for communication between the system of the device and the user.

A.3.7 On-board Transmission Bus (OBTB)

On-board Transmission Bus enables the control of the AAS by the board controller of the Vehicle Board Information and Control System (VBICS).

A.3.8 Passenger information system

A passenger information system is concerned with:

— Information provision and exchange about the network services (timetables, etc),

— Optimisation of passenger trips (trip proposals made according to specific criteria, etc),

— Management of Public Transport resources (sales points, validators, passenger information devices, etc).

A.3.9 QUAY - IFOPT

A place such as platform, stance, or quayside where PASSENGERS have access to PT vehicles, Taxis or other means of transportation. A QUAY may serve one or more VEHICLE STOPPING PLACES and be associated with one or more STOP POINTS.

A.3.10 QUAY Passenger Information System

A QUAY Passenger Information System or Stop Passenger Information System is primary defined as non interactive dynamic man machine interface between the Automatic Vehicle Monitoring System (AVMS) and the PASSENGER at a QUAY. It should comply with ENV 13998 - Non-interactive dynamic passenger information on ground. This interface is basically visual. It has to incorporate an audio communicator to give audio information on demand from the VIP.

Figure A.1 — Example of stop mounted non-interactive real-time information display

Figure A.2 — Example of wall-mounted non-interactive real-time information display

A.3.11 Short Data Service (SDS)

The Short Data Service is designed to send relatively short messages (up to 2047 bits) or predefined status messages and is implemented as part of signalling of the system TETRA.

A.3.12 Short Message Service (SMS)

SMS as used on modern handsets was originally defined as part of the Global System for Mobile Communications |GSM] series of standards in 1985, "Services and Facilities to be provided in the GSM System", as a means of sending messages of up to 160 characters (including spaces) to and from GSM mobile handsets.

A.3.13 Sign (Sign panel)

An indicator with a sign panel with visual information is a part of a non-interactive dynamic passenger information on the ground.

A.3.14 Stop Passenger Information System

See QUAY Passenger Information System.

A.3.15 Surveillance Information System

Surveillance Information System is primarily a dynamic non interactive man machine interface between the Automatic Vehicle Monitoring System (AVMS) and the PASSENGER at a STOP PLACE ENTRANCE, ACCESS SPACE or similar location. This interface is basically visual and would be in compliance with ENV 13998, Non-interactive dynamic passenger information on ground. It should have an incorporated audio communicator to give audio information on demand from a VIP over a fixed loudspeaker.

Figure A.3 — A non-interactive passenger information display for multiple stops

Figure A.4 — A non-interactive real time information display

A.3.16 TETRA

TErrestrial Trunked RAdio (TETRA) (formerly known as Trans European Trunked RAdio) is a specialist Professional Mobile Radio and two-way transceiver. It uses Time Division Multiple Access (TDMA) with four user channels on one radio carrier and 25 kHz spacing between carriers. Both point-to-point and point-to-multipoint transfer can be used. Digital data transmission is also included in the standard though at a low data rate.

A.3.17 TETRAPOL

TETRAPOL is the name of a fully digital radio communication standard for professional communications organisations It is based on an FDMA (frequency division multiple access) multiplex approach using a narrow-band channel operating at 12,5 kHz channel spacing.

A.3.18 Vehicle Board Information and Control System

The Vehicle part of the Automatic Vehicle Monitoring System. VBICS is created by all devices installed on-board the vehicle, which are controlled by the board computer (controller).

A.3.19 Wi-Fi

Wi-Fi is the standard for local wireless nets as specified in the IEEE 802.11.

A.3.20 Wireless Local Area Network (WLAN)

IEEE 802.11 is the Wi-Fi standard with accessories for the local wireless networks (Wireless LAN, WLAN) developed by the 11^{th} working group IEEE of LAN/MAN standard commission (IEEE 802). The term 802.11x is used for the set of supplements to this standard. It operates at the frequency ranges 2,4 GHz and 5 GHz with bit rates 11 MHz/s, 54 MHz/s and 540 MHz/s.

Annex B
(informative)

Examples of implementations of described use cases

B.1 Introduction

Practical examples of applications of the rules which have been presented as proposals for a Technical Specification for Traveller Information for Visually Impaired People are described in this annex. Examples of use cases are based on practical experiences from the Czech Republic.

The basic necessary condition for implementation of Traveller Information for Visually Impaired People is the same as for the real time visual information. An example of the basic network for real time information for public transport is on Figure B.1.

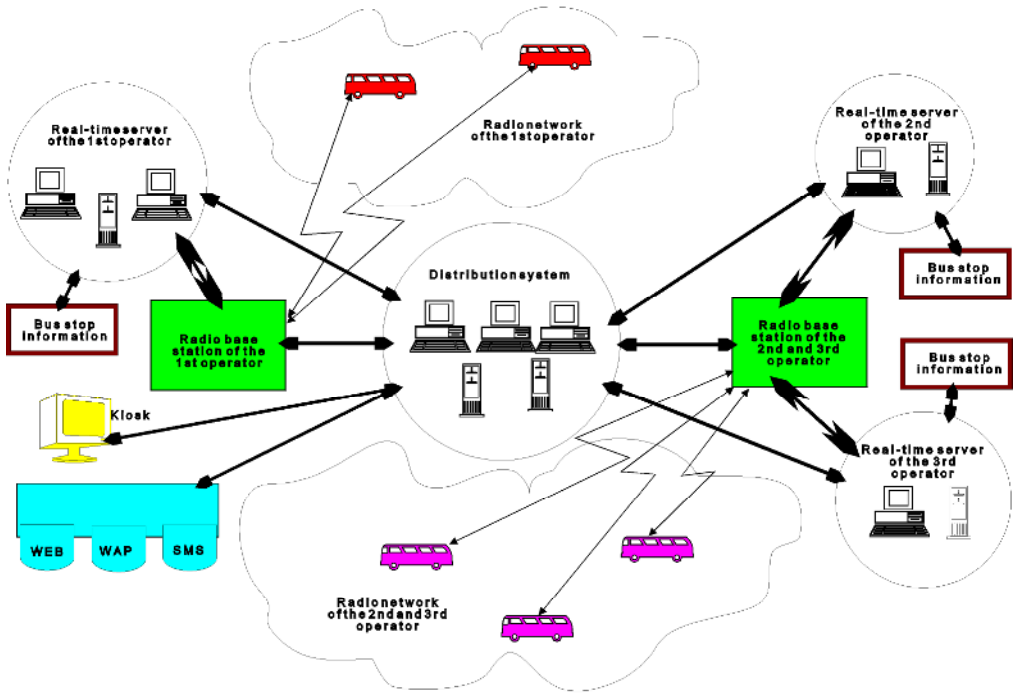

Figure B.1 — Functional diagram of real time communication paths

This configuration is sufficient for the end-user devices of classes a and b.

The configuration for the end-user device of the class c should be more sophisticated.

B.2 Stop information system

The scenario is: The VIP is at the tram stop. In Figure B.2 is an example of a tram stop with the Stop information system.

Figure B.2 — A tram stop with the Stop information system

Figure B.3 — Tram stop at which display can be mounted

The communication between the visually impaired passenger and the information system is undertaken in one or two steps as is described in Table B.1. The number of the appropriate key is not mandatory. It is used only as an example.

The first step can be omitted if the VIP knows that the information system is active.

Table B.1 — Communication between the VIP and the Stop information system

Step	Action of the VIP	Operation of the end-user device	Response of the Stop information system. Announcement from the information system loudspeaker
1	The VIP presses the key N° 1 on the end-user device	It sends a radio command.	The name of the stop "***Hlubočepy***" or gong
2	The VIP presses the key N° 2 on the end-user device	It sends a radio command.	Contents of stop sign: "***The first connection line N°12 towards Palmovka , departing in 3 minutes, next connection line N°6, towards Kubánské náměstí departing in 4 minutes, next connection line N°14, towards Střelničná departing in 12 minutes."***

B.3 Recognition of the line number and terminus

A following scenario occurs: The VIP is standing alongside the tram that pulled in at the stop as is shown on Figure B.4.

Figure B.4 — The VIP with the end-user device in his hand and the tram at the stop

The communication between the visually impaired passenger and the information system is in progress in one or two steps as is described in Table B.2. The number of the appropriate key is not mandatory. It is used only as an example.

Table B.2 — Communication between the VIP and the Vehicle Board Information and Control System

Step	Action of the VIP	Operation of the end-user device	Response of the Vehicle Board Information and Control System.	Rem.
1	The VIP presses the key N° 3 on the end-user device	It sends a radio command.	Announcement from the information system external loudspeaker: The name of the line and terminus: ***"Line number 12 towards Palmovka"***	
2	The VIP presses the key N° 4 on the end-user device	It sends a radio command.	Announcement from the information system driver's loudspeaker: "***Blind person wants to get on"***	#

NOTE # The second step will be used only when the VIP decides to get on the tram of an announced line and direction.

Annex C
(informative)

List of projects and guidelines

C.1 Projects and recommendations prepared for European and worldwide levels

The list of projects and recommendations prepared for European and worldwide levels are in Table C.1.

Table C.1 — List of projects and recommendations *(1 of 2)*

Institution / Research-project	Guideline	Year of issue	Affected scope
Trace Research & Development Center (USA)	Accessible Design of Consumer Products. Guidelines for the Design of Consumer Products to increase their accessibility to people with disabilities or who are aging	1992	Products general
FACE (Familiarity achieved through common user interface elements; EU-Project)	Guidelines and Rules for Design of User Interfaces for Electronic Home Devices	1994	Telecommunication, only MMI
EIA / CEMA, EIF (Electronic Industries Alliance's / Consumer Electronics Manufacturing Association, Electronic Industries Foundation; USA)	Resource Guide for Accessible Design of Consumer Electronics	1996	Electronic Products
Consumer Safety Institute (NL)	Product Safety Guide for the Elderly	1999	Products general (safety)

Table C.1 — List of projects and recommendations *(2 of 2)*

Institution / Research-project	Guideline	Year of issue	Affected scope
COST 219 to (COST = European co-operation in the fields of scientific and technical research)	Design Guidelines on Smart Homes	1999	Smart Home
STAKES / COST 219 to (STAKES = National Research and Development Centre for Welfare and Health : Finland)	Telecommunications – Guidelines for Accessibility	1999	Telecommunication
RNIB (Royal National Institute for the Blind; GB)	Which button? Designing user interfaces for people with visual impairments	2000	Products general (MMI)

C.2 Guidelines for European and worldwide levels

A list of guidelines prepared for European and worldwide levels can be found in Table C.2.

Table C.2 — List of guidelines *(1 of 2)*

Source	Guideline to standard / standard	Year of issue	Content
ADA and ABA Accessibility Guidelines for Buildings and Facilities	Contains scoping and technical requirements for accessibility to sites, facilities, buildings, and elements by individuals with disabilities.	2004	Guideline for implementation of ADA. All public buildings, means of transportation, telecommunication- and IT-services have to be accessible for disabled persons.

Table C.2 — List of guidelines *(2 of 2)*

ISO/IEC CEN/CENELEC JISC (Japan)	Guide 71 'Guidelines for standardization to address the needs of older persons and people with disabilities'. Adopted by CEN/CENELEC as Guide 6 and by JISC as JIS Z 8071.	2001	This document guides standardization committees to recognise the needing of elderly and handicapped people. To be incorporated in standards.
ISO/TR 22411 (ISO/TC 159 WG2)	Ergonomic data and ergonomic guidelines for the application of the ISO/IEC Guide 71 in standards related to products and services to address the needs of older persons and persons with disabilities.	2006	To assist in the adoption of guide 71 which shall be prepared in the form of a technical report to inform the standardization committees.
DIN Fachbericht 124 (Germany)	Products in “Design for All”" (Translation of DIN Fachbericht 124 ‘Barrier free products. Principle and requests 2001)	2002	Defining of quality requests to technical products for usage by people with limited abilities. Addressing product designer and standardization committees. Although not specifically mentioned, almost all requests are usable in public transport for components and infrastructure. Foreseen as a basic document for the development of an additional document to the ISO-guide 71 in the newly founded ISO/TC 159 WG 2 "Ergonomics for People with special requirements"
CEN/CENELEC /ETSI	Guidance document in the field of safety and usability of products by people with special needs (e.g. elderly and disabled) [1)]	2003	Regulations for safety and usability of products for People with special requirements (Elderly and handicapped). Addressing standardization committees.

1) The European Commission has announced that as stipulated in their guidance document, all relevant product-standards have to be reviewed and changed if necessary.

Bibliography

[1] EN 12694, *Public transport – Road vehicles – Dimensional requirements for variable electronic external signs*

[2] EN 12896, *Public transport and traffic telematics – Public transport – Reference data model*

[3] EN 13149-1, *Public Transport – Road Vehicle Scheduling and Control Systems – Part 1 WORLDFIP definition and application rules for On Board Data Transmission*

[4] EN 13149-2, *Public Transport – Road Vehicle Scheduling and Control Systems – Part 2: WORLDFIP Cabling Specifications*

[5] CEN/TS 13149-3, *Public Transport – Road Vehicle Scheduling and Control Systems – On Board Data Transmission between Equipment inside a Vehicle -- Part 3: WORLDFIP Messages*

[6] EN 13149-4, *Public Transport – Road Vehicle Scheduling and Control System – Part 4 General application rules for CAN Open transmission buses*

[7] EN 13149-5, *Public transport – Road Vehicle Scheduling and Control System – Part 5: CAN Open Cabling specification*

[8] CEN/TS 13149-6, *Public transport – Road Vehicle Scheduling and Control System – Part 6: Messages*

[9] ENV 13998, *Road transport and traffic telematics – Public transport – Non-interactive dynamic passenger information on ground*

[10] CEN/TS 15504, *Public transport – Road vehicles – Visible variable passenger information devices inside the vehicle*

[11] CEN/TS 15531-1, *Public transport – Service interface for real-time information relating to public transport operations – Part 1: Context and framework*

[12] CEN/TS 15531-2, *Public transport – Service interface for real-time information relating to public transport operations – Part 2: Communications infrastructure*

[13] CEN/TS 15531-3, *Public transport – Service interface for real-time information relating to public transport operations – Part 3: Functional service interfaces*

[14] CEN/TS 15531-4, *Public transport – Service interface for real-time information relating to public transport operations – Part 4: Functional service interfaces – Facility Management*

[15] CEN/TS 15531-5, *Public transport – Service interface for real-time information relating to public transport operations – Part 5: Functional service interfaces: Situation Exchange*

[16] CEN/TS 28701, *Road transport and traffic telematics – Public transport – Identification of Fixed Objects in Public Transport*

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