INFORMATION SYSTEM FOR INTEGRATED PASSENGER TRANSPORT SYSTEMS

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1. Introduction

Information system is one of important features of integrated system of public passenger transport (ITrS) next to other important preconditions. There is paid not so much attention to information system (IS) in often occurred publications dealing with ITrS. This paper is able to provide at least basic information about this field. (1)

The main aim of this paper is to determine basic requirements on IS and its content as well as to determine basic elements of IS for ITrS. Informational content of these elements of IS for ITrS and targets and content of informational service will be also proposed.

2. Basic Presumptions and Targets of Information System for ITrS

Development of joint informational data basis of all subjects participating on realisation of transport supply is basic presumption of IS for ITrS. In general, separately-based information providing by individual ITrS participants has to be removed. Development of joint information base for whole region is the main task of IS in ITrS. Stabile, actual, strict, complex and understandable providing of information about rules of ITrS operation and about short-time as well as about long-time changes in ITrS operation will be possible in the way of this IS.

IS is defined by a set of given parameters. Basic set of these parameters is visible in the table 1.

Tab. 1 *Parameters of informational structure*

Parameter	Domain	Example of values
Information content	Transport system, users of transport system, transport documents (tickets), surrounding of the system	Transport documents are … Zone is …
Position (location)	Vehicle, stop, station, city furniture, transport system, internet	Stop shelter, Internet websites, stabile information board
Information medium	Printed material, electronic medium	Paper, plastic board, illuminating board (display), CD/DVD, etc.

Source: Authors and (3)

Every user of ITrS transport supply (passenger), regular as well as firstly coming, can get all needed information about all supplied services in the way of the joint IS for ITrS. Provided information is able to be divided from 2 points of view – on strategic, tactical and operational information or on information provided before and during transport process. (2)

Information provided before transport process

Three types of information – tactical, operational and first of all strategic information are required by passenger before the own transport process will start. Perspective possibilities are able to be ensured in the way of Internet utilization. The situation occurring in the Czech Republic has to be pointed out. The National information system of timetables (NISTT) is operated by the firm CHAPS Ltd. since 26 October 2001 in consonance with valid legislation by commissioning of the Ministry of Transport of the Czech Republic. (2)

NISTT is an IS containing information about all transport connections in the Czech Republic. Data about bus, railway, air, inland waterway and urban public transports are included. Data about bus transport are provided by regional (or in some cases by municipal) authorities into NISTT database. Data about other times tables (in other modes of transport) are provided by individual transport operators operating the service.

Information provided during transport process

Operational information is needed during transport process by passenger first of all. It goes especially about actualized information about arrivals and departures of vehicles (especially in the case of possible delay). Second important operational information is about place of vehicle providing (number of track, platform, stop) and about the way to this place.

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Tab. 2: Information asked by passenger for journey in the frame of ITrS

	required before entering of transport process	required during transport process
Strategic information	Information for journey planning (transport modes, structure and extent of transport network) Information for comparison of transport modes and selection of the main transport mode from the points of view of time, space, price as well as transport possibilities. ITrs Tariff information (price of transport documents) and information where it is possible to buy them.	
Tactic information	Information about interconnection of the main transport mode (or modes) to urban public transport	
Operational information	Information about concrete departures/arrivals of vehicles	Information about concrete departures/arrivals of vehicles. Information about ways of passengers' movement and ensuring of stay during journey (transport process), especially in spaces of transport devices.

Source: Authors and (3)

Development of IS for providing of real-time information in ITrS is the current aim. Controlling of transport in real time is related to informational transferring between driver, dispatching centre and passengers. It must be supported by data and voice communication system operated in real-time. There are five main subjects connected by this communication: vehicles, dispatching centre, depots (garages), signalized junctions and stops (electronic information boards – displays). Passengers in vehicle are informed by driver or by dispatcher (automatically without involving of driver) in the way of voice messages or electronic information boards. Passengers at stops are informed by information boards (displays) or by device located on stop shelter.

Real time providing of information is able to be considered as ideal solution only, not as standard. Time validity of information is able to be standardized by all elements of information system.

3. Elements of IS and their Informational Content

The overview of elements in IS is based on above mentioned characteristics and on defined elements of information system. Extent of these elements is different in before-transport process and during-transport process information service.

Table 3: *IS elements and their content for before-transport process phase*

Element	Content	Medium	Location (position)
Great information poster	Description of network of all ITrS in the shape of graphic scheme incl. ITrS tariff scheme Clear price list of fare Excerption from transport and fare conditions and other information	Paper poster (size according to standards of city furniture)	Stop shelters, stations, city furniture
Websites	ITrS tariff, incl. clear fare price list Transportation contractual conditions Tariff scheme Plan of transport network Contact information on individual transport operators List of information offices and centres Link to electronic timetables and more	Internet	It is able to be recommended, that official websites may be located on own domain with the name equal to the name of the ITrS
Electronic timetables	Complete timetables of all transport operators integrated in the ITrS Tariff Maps Eventually other information	National information system of timetables	Relevant Internet websites and software products of the firm CHAPS (in the case of the Czech Republic)
Printed timetables	Complete timetables of all transport operators integrated in the ITrS ITrS tariff, incl. clear fare	Book	Able to be bought in all information centres and offices as well

Element	Content	Medium	Location (position)
	price list Transportation contractual conditions Tariff scheme Plan of transport network Contact information on individual transport operators List of information offices and centres		as in selected bookstores
Information guide	Brief characteristics of the ITrS Explanation of new tariff system and description of changes in comparison with state-of-art situation Graphic demonstrations of various forms of using of different tickets (transport documents) ITrS tariff, incl. clear fare price list Transportation contractual conditions Tariff scheme Plan of transport network Contact information on individual transport operators List of information offices and centres FAQ	Book	Available at all information centres and offices

Source: Authors and (3)

***Tab. 4:** IS elements and their content for during-transport process phase*

Element	Content	Medium	Location (position)
Great information poster	Description of network of all ITrS	Paper poster (size according	Stop shelters, stations, city

Element	Content	Medium	Location (position)
	in the shape of graphic scheme incl. ITrS tariff scheme Clear price list of fare Excerption from transport and fare conditions	to standards of city furniture)	furniture
Small information poster	Description of network of whole ITrS in the shape of graphic scheme incl. ITrS tariff scheme Clear price list of fare Excerption from transport and fare conditions	Paper poster	Reserved spaces in vehicle interior
Exterior marking of vehicles	Marking affiliation with ITrS – ITrS logo displaying that it is a connection operated in the frame of the ITrS. Displaying of line number Displaying of name of final stop (destination)	Coat of paint, sticker, plastic board, electronic information boards	Place on the vehicle visible from outside
Stop timetables	Information about departures of individual lines from given stop Lists of stops of individual lines	Paper	Stop sign or shelter
Information about stops	Name of actual stop Name of following stop Information about transferring possibilities and about consecutive connections	Data medium (usually CD/DVD or other possibility)	In vehicle

Source: Authors and (3)

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4. Information Service in ITrS

Information service provided in qualified way must take a part of marketing strategy of the ITrS for its successful development and future operation. Passengers – customers are the top of the ITrS, they are choosing the way of transportation service after their own discretion in the situation of rising requirements on quality, timeliness, speed and safety of provided services. Informational service of ITrS can be divided into two main parts: promotion campaign for introduction of (new) ITrS and permanent informational service.

Promotion Campaign for ITrS Introduction

The main aim of the introduction campaign is to explain reasons for ITrS setting into operation to passengers and to describe division of area into tariff zones, structure of transport documents as well as basic transport conditions and rules of the ITrS. The main regard could be put on explanation of types of transport documents and range of their validity. (2)

The core of promotion campaign can be based in following activities:

- press conferences for mass media,
- information in newspapers for general public,
- information distributed into households in the area covered by the ITrS:
    - regional pages of nationwide newspapers,
    - local journals,
    - leaflets at "Official Document Boards" of local authorities (city borough authorities),
    - information in local TV or radio broadcasting,
- information at sales and informational centres of the ITrS,
- information at stops of public passenger transport,
- information in touristic information centres of individual towns and cities.

It is necessary to make following decisions in the case of preparation of promotion campaign for ITrS introduction.

1. What are the goals of promotion campaign?
2. How much money is possible to be invested?
3. What information may be promoted (presented)?
4. What kind of mass media (and information channels) are able to be used?
5. How the results will be evaluated?

Ad1) Informing of public transport users (passengers) about newly loaded ITrS in given region and convincing of them that ITrS is advantageous for them must be the main goal of the promotion campaign. This promotion must be realised in starting phases of campaign for creation of future demand after provided services. It is necessary to describe new services as well as principles of ITrS operation and also positive impacts

on passengers in the campaign. It is also important to announce changes in transport supply (like changes in line structure, intervals and capacity of vehicles etc.) able to be occurred and their impacts on passengers.

Ad2) Not only own financial possibilities of authority responsible for establishment of ITrS must be taken into consideration. It is a common fact, that the new things on market need generous budget. Requirements on budget are also influenced by demands of processing of reports, by selection of used mass media and information channels, by frequency of propagation (number of repeating necessary for enforcement by passengers), etc.

Ad3) Propagation must not attract attention of public only, but it must also maintain interest and support transport demand able to be ensured by promoted services. Promotion report can have rational (intellectual) side as well as emotional side. Both of them are same significant and they both have to be in accordance.

Ad4) The goal is to find such mass media and information channels able to deliver information about promoted services to target group (of passengers) in the most effective way (with regard to costs).

Ad5) Evaluation of communication and sales impacts of promotion campaign is required by this act. It must be done before, during and also after promotion campaign. Character of promoted product and timing of promotion are core parameters by evaluation of promotion campaign. It goes about setting of optimal time period for evaluation if the campaign is successful or not. Impact of promotion campaign is able to be evaluated after impact extent:

- target subject has perceived it,
- target subject has took into account,
- target subject has remember it,
- an attitude has been changed by target subject,
- attitude as well as action (transport behaviour – e.g. mode choice) have been decided for change by target subject,
- action (behaviour) has been really changed by the target subject.

Promotion campaign is recommended to be started by press conference organized by representatives of transport coordinator. Information materials have to be prepared and prepared media for their distribution in the moment of presentation of first information so that information demand will be able to be covered. Promotion campaign usually will have 2 peaks as follow from experience.

This first peak will be occurred after press conference and after promotion of first information about prepared ITrS (usually it will be reached in 2 – 3 weeks after press conference). Increased interest about prepared ITrS is able to be invited by general public. The second peak will be reached directly before setting of ITrS into operation and shortly after it. All promotional activities are able to be conducted to cover both

peaks. The strongest interest about ITrS by general public is able to be seen in the time of ITrS operation start.

Thorough training of drivers, salesmen, ticket inspectors and mangers must be ensured in defined time period before the campaign will start. It is necessary for ability of these employees to provide correct information about newly prepared ITrS to general public (passengers).

Permanent Information Service

Permanent information service is able to be ensured in the way of newly opened information office or centre or also in the way of existing information capacities. These capacities can be touristic or informational centres of individual towns and cities or informational offices of individual transport operators.

Operation of websites is also able to be considered as one of core elements of the permanent information service. The websites have to contain at least following information:

- a brief characteristics of ITrS,
- a brief characteristics and contact on authority in the role of ITrS coordinator,
- ITrS tariff including clear price list,
- contractual transport conditions,
- plan of tariff system (e.g. of tariff zones),
- plan of transport network,
- contacts on individual transport operators,
- list of information offices and centres,
- Internet link to electronic timetables, eventually to own optimal connection search engine, incl. fare (price) calculation.
- operative traffic information provided in actual way (changes in transport, diversions, etc.).

5. Conclusion

The paper is focused on actual questions of information systems operated within integrated systems of public passenger transport (ITrS). Some specifics as well as some recommendations able to be fulfilled are mentioned in the paper next to basic characteristics of given questions.

It was not a target of this paper to provide detail and complex characteristics of solved questions, but the aim is to acquaint readers with these questions only. It will be seen as beneficial if more papers and publications will be focused on these questions or on parts of this filed. All serious comments to this paper will be welcomed by the authors of this paper.

References

1. VONKA, J. et al. *Osobní doprava (Passenger Transport).* 2. zkrác. vyd. (2. contracted printing) Pardubice : Tiskařské středisko Univerzity Pardubice, 2004. 162 s. ISBN 80-7194-630-3.

2. *Integrace dopravních systémů a zajištění dopravní obsluhy v regionech* (An Integration of Transport Systems and Transport Service in Regions). Výzkumná zpráva (research report) PD602 340 602. CS-Project, Praha, 2000. 32 s.

3. *Projekt optimalizace dopravní obslužnosti Jihočeského kraje - část II: Systémový návrh Integrovaného dopravního systému Jihočeského kraje* (The System Project of Optimization of Transport Service in Region South Bohemia – part II: System Design of Integrated Transport System in Region South Bohemia). CS-Project, Praha, 2003. 106 s.

Resumé

INFORMAČNÍ SYSTÉM INTEGROVANÝCH DOPRAVNÍCH SYSTÉMŮ

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Jednou z důležitých součástí integrovaných dopravních systémů (IDS) je vedle mnoha dalších i informační systém. V četných publikacích, věnujících se této oblasti, se neoprávněně tomuto věnuje malá pozornost. Tento příspěvek se proto snaží poskytnout aspoň základní informace z této oblasti. Cílem příspěvku je vymezit cíle a obsah informačních systémů (IS) v IDS, definovat základní prvky IS v IDS, navrhnout informačně obsahové naplnění prvků IS v IDS a vymezit cíle a obsah informačního servisu IDS.

Základním předpokladem IS IDS je vytvoření společné informační databáze všech účastníků IDS, kteří se podílejí na realizaci nabídky přepravních služeb. V zásadě by tak mělo být odstraněno separátně prováděné informování cestujících jednotlivými účastníky IDS. Cílem IS IDS je tedy vytvoření společné informační základny pro celý region, která bude umožňovat trvale, aktuálně, přesně, komplexně a srozumitelně informovat cestující veřejnost o pravidlech a zásadách provozu IDS a o změnách v dopravním systému v krátkodobém i dlouhodobém horizontu.

Každý uživatel přepravní nabídky IDS, ať už stálý či nově do systému příchozí, by se měl pomocí společného IS IDS dozvědět potřebné informace o celkových nabízených službách IDS. Informace se dělí podle 2 hledisek na informace strategické, taktické a operační nebo v předcestovní a cestovní fázi.

V současnosti je cílem pro informační zabezpečení cestujících v této fázi tvorba integrovaného informačního systému, který by pracoval v reálném čase. Řízení veřejné hromadné dopravy v reálném čase znamená především okamžité předávání informací mezi řidičem, cestujícími a dispečinkem. Informační zabezpečení cestujících v reálném čase se považuje za ideální stav, nikoliv za standardní řešení. Standardizována časová platnost poskytovaných informací by měla být však u všech prvků v informačním systému.

Má-li být projekt vytváření IDS úspěšně zaveden a v budoucnu provozován, musí být součástí jeho marketingové strategie kvalifikovaně prováděný informační servis. Rozhodujícím činitelem IDS jsou totiž jeho zákazníci - cestující, kteří si způsob uspokojení svých přepravních potřeb volí na základě vlastního uvážení, při současně rostoucích požadavcích na kvalitu, včasnost, rychlost a bezpečnost nabízených služeb. Informační servis IDS by měl mít v zásadě dvě hlavní složky: úvodní propagační kampaň a stálou informační službu.

Zusammenfassung

DAS INFORMATIONSSYSTEM FÜR VERKEHRSVERBÜNDE

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Ein wichtiger Teil des Verkehrsverbunds (VVB) ist neben vielen anderen auch Informationssystem. In vielen Publikationen aus diesem Bereich wird diese Problematik zu Unrecht nur wenig Aufmerksamkeit gewidmet. Dieser Artikel will daher zumindest grundlegende Informationen in diesem Bereich bieten. Das Ziel dieses Artikels ist es, die Ziele und Inhalte von Informationssystemen (IS) in VVB, die Ziele und Inhalte der Informations-Service des VVBs und die grundlegenden Elemente der IS in VVB zu definieren, ein Informationsinhaltausfüllen der IS-Elemente zu entwerfen.

Der Grundgedanke IS VVB ist die Schaffung eines gemeinsamen Informations-Datenbank von allen VVB-Teilnehmern, die bei der Durchführung des Angebots von Verkehrsleistungen beteiligt sind. Im Prinzip sollte separate Informierung der Reisenden von den einzelnen VVB-Teilnehmern entfernt werden. Das Ziel des IS VVBs ist, die Bildung eine gemeinsame Informationsbasis für die gesamte Region zu schaffen, die eine kontinuierliche, zeitnahe, genaue, umfassende und klar der Reisende über die Regeln und Grundsätze des Betriebs des VVBs und über Änderungen in das Verkehrssystem durch kurze und langfristige Zeithorizont informieren wird.

Jeder (dauerhaft oder neu ankommenden) VVB-Beförderungsangebot-Benutzer sollte gemeinsam die erforderlichen Informationen zu dem insgesamt angeboten Dienste des VVBs lernen. Die Information wird durch zwei Aspekte auf der strategischen, taktischen und operativen oder Vorreise-Phase und Reise-Phase unterteilt.

Derzeit ist der Auftrag für die Sicherheit der Fahrgäste Informationen in diesem Stadium der Entwicklung eines integrierten Informationssystems, das in Echtzeit arbeiten würde. Steuerung der öffentlichen Verkehrsmittel in Echtzeit bedeutet in erster Linie die sofortige Übertragung von Informationen zwischen den Fahrer, Reisende und Disponenten. Informationen Sicherheit der Reisenden in Echtzeit wird als Idealzustand, nicht die Standardlösung, sein. Standardisierte zeitliche Gültigkeit der bereitgestellten Informationen sollte aber für alle Elemente im Informationssystem sein.

Wenn das Projekt der VVB-Schaffung in der Zukunft erfolgreich umgesetzten und betrieben wird, werden ein Teil ihrer Marketingstrategie auch kompetentes Informationsdienst sein müssen. Der entscheidende Faktor des VVBs sind seine Kunden - Reisenden, die Art und Weise ihre Verkehrsbedürfnisse nach eigenem Ermessen wählen. Sie erfordern gleichzeitig steigenden Anforderungen an Qualität, Aktualität, Geschwindigkeit und Sicherheit angebotenen Dienste. Info-Service des VVBs sollte grundsätzlich zwei Hauptkomponenten: initiale Werbekampagne und kontinuierliche Informationsservice.