

## ORGANIZATIONAL LEVEL OF PUBLIC TRANSPORT CONTROLLING IN PUBLIC TRANSPORT SYSTEM

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Controlling of public transport is a newly developed term just in connection with the IDS development. It is and it will be a direct support of the functioning transport system in the region, namely the support of interconnections of individual lines and services of individual transport operators. Transport technologists who have introduced this term, however, use it to cover all what is connected with the development of public transport in regions. This means a plan of the lines, awarding of contracts to transport operators, creation, monitoring of JŘ adherence, payments in the public transport, monitoring of provable losses, etc., but also the planning and the development of transport routes, transport terminals and interchange junctions. This very general term is not suitable from the viewpoint of creation of information and telematic support. This has already been highlighted by the solvers of the project entitled "Plans of ITS development in the link to the performance of state administration and local government", and therefore they have proposed a necessity of division of this term from the viewpoint of the existing, but especially the future organisation levels in the field of planning, actual organisation and control of public transport in regions. This is given by the presupposed model of activities of a coordinator of public transport.

Within research project solving number 1F83A/049/190 called "The technical support for public administration decision making in the area of public bus transport in company with planning and modeling of demonstrable haulers financial loss, live cycle cost, evaluation of adequacy and vehicles quality" were analyzed controlling of public transport issues especially in organizational level.

**Key words:** obligation of public services, economical authorized common hauler costs, controlling of mass public transport, public transport, economy of public transport, public transport managing, public transport planning

### 1 Controlling of mass public transport

**The planning** level of controlling monitors and analyses the transport relations within the area. For this purpose it is possible to use a SW tool for the transport modeling. A source of information for these tools in the target condition will be, among other things also the architecture of transport telematics of the conurbation or region. In Figure 2.14 -1 it is possible to see the basic resources of information. This is followed by a plan of the services in the area, line routing plans, plans of interchange junctions etc.

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**The organisational** level monitors the issues of the existing transport system, its negative as well as positive aspects. For a new draft model it will process the conditions of interchange links, basically through the follow-up guarantee document. It will supply proposals for building treatments of interchange junctions in such a way that the interchanges can be fast and fluent. For a new proposal it will draw up draft timetables according to the conditions of interchange junctions. If the transport system is organised according to the principles of regular-interval timetables, key information will then be formed by system times of train diagrams. These are then a decisive parameter for the proposal of capex activities aimed not only at constructions but also at telematic systems of the transport infrastructure.

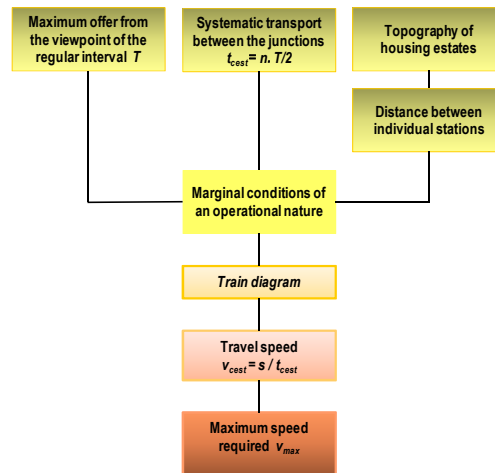


Fig. 1 Principle of creation of regular-interval timetables

Virtually all the parameters displayed are very important information for transport engineers from the viewpoint of constructions and technical systems of transport routes, represented by transport telematics. In Figure 3.13.2 - 1 it is possible to see the principle of the control room of the organisational level of the public transport controlling. The Figure indicates the possibility of application of the information which is to be provided for the drawing up the proposal of the area services by the transport telematics during implementation of the proposal of transport services for the area in question. The information focus will be formed by practical implementation statistics, as well as by economic parameters of the transport system.

**The operational** level provides to the entire controlling system important information with the active implementation of the area services. This information has a high descriptive capacity, because from time series it is possible to read essential impacts on the public transport systems. These impacts may concern the issues of insufficient capacities of the transport infrastructure, transport terminals, insufficient equipment of the transport routes with transport-telematic systems, etc. Transport telematics is an enormous information source for transport engineering. All is clear from 2.15.1 - 1. The actual operational level for a new solution of transport services will issue a signal, resulting from the knowledge of the operational conditions of the real system, with an emphasis placed on fulfilment of marginal conditions of the train diagram.

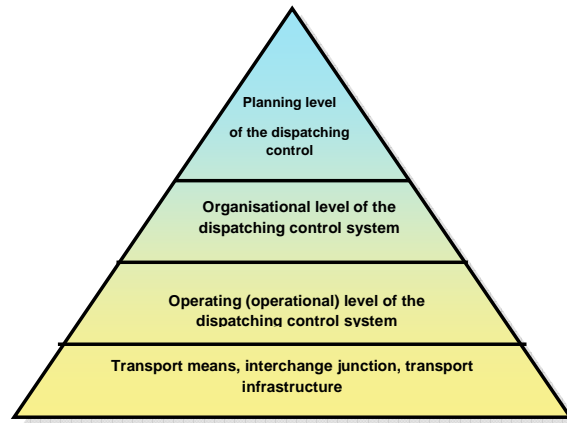


Fig. 2 Principle of architecture of the dispatching control system of public transport

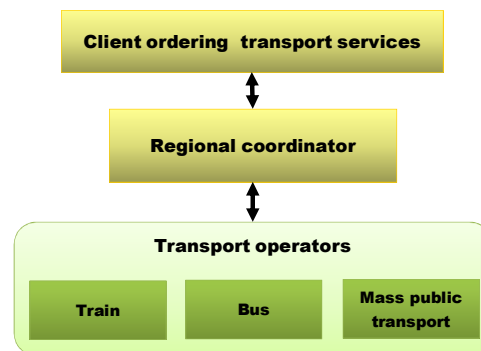


Fig. 3 Position of the public transport coordinator

The actual controlling features three basic levels from this point of view:

- I. Control (operating) level**
- II. Organisational (tactical) level**
- III. Planning (strategic) level**

Individual controlling levels differ from each other in terms of functions which are fulfilled by them in the entire system, and of positions within the system resulting from such functions.

Each of these levels is currently supported by transport telematics applications. The tool of actual implementation of a regional transport policy is and will be formed by capital expenditures into the transport infrastructure, infrastructure of terminals, technical systems of transport routes, but also by the subsidy policy aimed at transport operators in view of assurance of the guaranteed transport services by monitoring the level of provable losses. In other words, public transport is currently supported by various levels of state administration, local government and their budgets. The division of the requirements of individual levels of the CONTROLLING system of public transport and their technical tools is a basis of a conceptual and effective solution to the development of transport and transport infrastructure in regions.

Control (operational) level of mass public transport controlling (1st level)

It fulfils functions of practical implementation of the transport control in IDS, with regard to transport services. This concerns monitoring of observance of the train diagrams, or JR, occupancy of individual services, revenues, costs etc. This controlling level moreover ensures provision of current information to passengers.

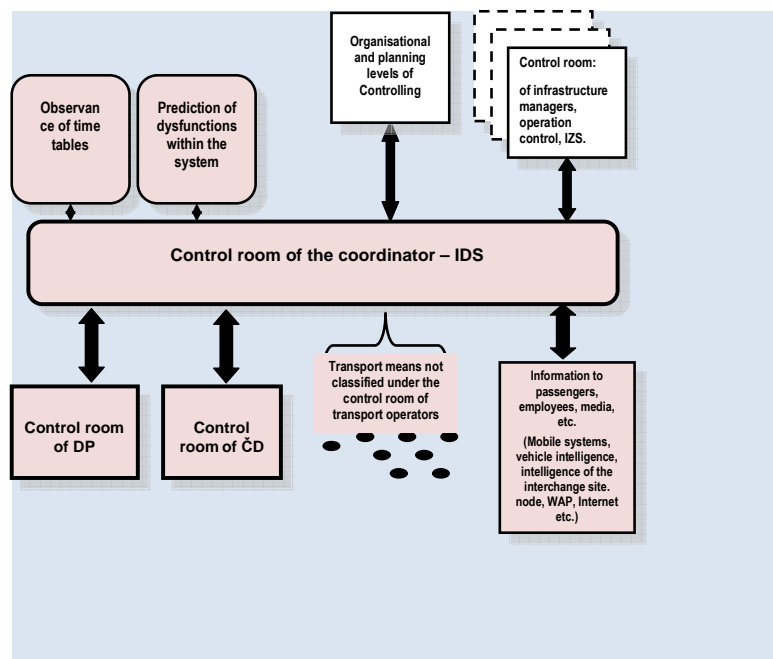


Fig. 4 Type model of a dispatching control of the operational public transport controlling level

A typical example of a solution of the “operating level” is the solution of influences of impacts generated by adverse situations, such as congestions, impassability of roads, accidents and other extraordinary situations affecting the transport fluency.

### 1.1 Organisational level of controlling of the mass public transport (2nd level)

It fulfils functions used for support of practical implementation of transport, it can be compared with installation of traffic signs along the roads. In relation to transport services, this concerns support of planning of individual services, lines of various transport operators and transport modes, time table schedules (JŘ), or train diagrams. This concerns also organisation of payments within IDS, organisation of dissolving of subsidy means as well as creation of contracts with transport operators and inspection of their fulfilment.

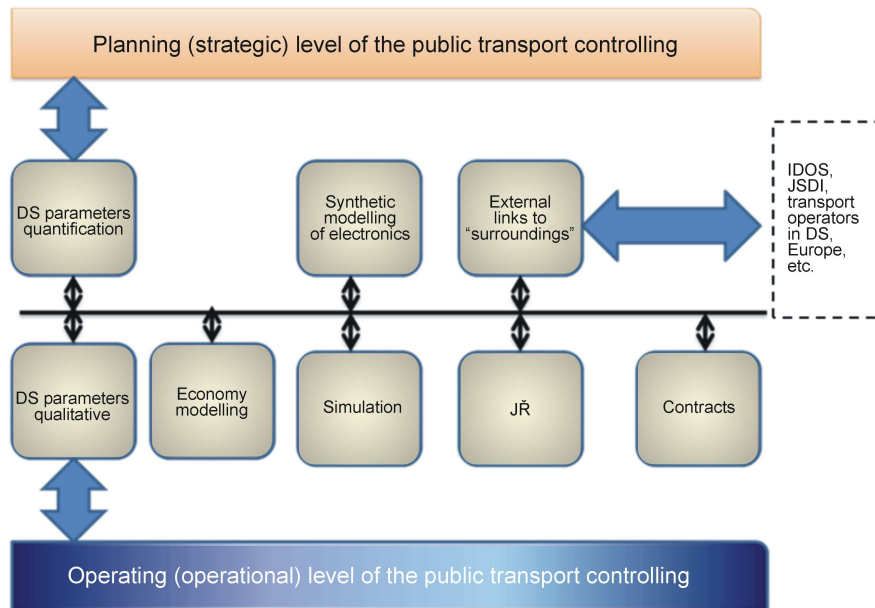


Fig. 5 Type model of a control room of the public transport controlling organisational level

### 1.2 Planning level of the mass public transport controlling (3rd level)

It fulfils functions of inputs into the land development and zoning plans. In relation to transport services this concerns planning of individual lines in such a manner that it can be possible to interconnect important centres of the region, industrial zones, social and tourist centres, etc. An important requirement of this level is also formed by optimisation and modernisation of construction of the transport infrastructure, transport terminals and interchange junctions.

The control room of a planning level has not been dealt with in any research project in the Czech Republic yet.

## 2 Inspection role of the mass public transport coordinator

The term “**inspection role**” should be understood as an inspection of fulfilment of the transport operators’ obligations, as it implies from the document entitled “Guarantees of follow-ups in IDS and inspections of decisions made by transport operators’ dispatchers about the *waiting time* in the case of an irregularity relating to *interchange times*”.

## 3 Control role of the mass public transport coordinator

The term “**control role**” should be understood as a full takeover of the transport operators’ obligations from the “Guarantees of follow-ups” document in the field of operational, planning control. These obligations include also the assurance of use of replacement transport means for those cancelled, markedly delayed, etc.

## 4 Summary of the “controlling” part

The research project “Telematic tool of the support of sustainable development of transport in regions” included methodologies connected with the division of the “too general” term of public transport controlling in such a manner that it can be possible to structure exactly the information flows and to “unfold” over the transport system of regions and conurbations a full-value telematic system which makes it possible to better plan, organise and control transport activities. The outputs of the project were

gradually compared with practice. They are and they will be implemented on a gradual basis. The knowledge from the project in the field of controlling have been adapted into the INOTECH programme of MD ČR, which was approved at the beginning of 2009 by the Government of the Czech Republic. The analysis of requirements of the controlling of public transport at organisational and technical levels becomes an important tool of transport engineers for the planning of transport development in regions.

Within the project solving there was made new concept of reporting, which came out from unified statements DOP 2-04 and DOP 3-04. New propositions come out from requirements defined in project within maximal respect to usual statement form that's used nowadays.

Further there was made a pilot tool for prediction and control of economical authorized common hauler costs. This tool use multidimensional linear regression.

Within this tool there is also applied synthetic approach. Necessary input dates are in both mentioned cases affected by certain inaccuracy and incompleteness.

For more varied procedures that serve getting required values was used fuzzy linguistic approximation.

## 5 Conclusion

Project points out divided approach in monitoring and evaluating of demonstrable financial loss. Continues outcomes however confirm ability of ITS tools in the area of monitoring organizational level of the mass public transport controlling.

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