

БАШИНЬСКА

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SMART-INNOVATIONS IN THE URBAN PASSENGER TRANSPORT IN  
THE CONTEXT OF SMART-CITY CONCEPTСМАРТ-ІННОВАЦІЇ В МІСЬКОМУ ПАСАЖИРСЬКОМУ ТРАНСПОРТІ У  
КОНТЕКСТІ КОНЦЕПЦІЇ SMART-CITY

*Some issues that were overlooked in the Concept of implementation of the modern model of the operation of UPT in Odessa are revealed. Problems of urban passenger transport functioning are revealed. The ways of improving the functioning of urban passenger transport through the upgrading of Smart-stops are proposed. Approximate cost of each variant is calculated.*

*Розкрито деякі питання, що залишилися поза увагою у Концепції впровадження сучасної моделі функціонування МПТ в м. Одеса. Запропоновано шляхи удосконалення функціонування міського пасажирського транспорту за рахунок до оснащення Smart-зупинок. Розраховано приблизну вартість кожного варіанту.*

**Keywords:** smart-innovations, urban passenger transport, public transport, the Concept of implementation of the modern model of the operation of UPT in Odessa, people with visual impairment, people with low vision.

**Ключові слова:** смарт-інновації, smart-інновації, міський пасажирський транспорт, громадський транспорт, Концепція впровадження сучасної моделі функціонування МПТ в м. Одеса, люди з вадами зору, люди з порушеннями зору

## INTRODUCTION

Urban passenger transport is one of the most important conditions for the development of the social and industrial-economic sphere of any city [1]. Comfortable urban environment – this is the space, as much as possible adapted to the needs of the citizens. Nowadays many countries of the world already have reasonable stoppages. They also feature charging for gadgets, Wi-Fi zones, and touch-enabled terminals. All this improves the lives of citizens because it is very convenient, but we propose for further improving the stops, thinking about all citizens.

For the development of the city, we need new ideas and approaches, the ability to go beyond the stereotypes; we must improve our living conditions, thinking about all citizens.

Very often, people with visual impairment ask to indicate which transport is going or do not see the number of the departing bus. The Concepts of implementation of the modern model of the operation of UPT in Odessa [2] implies the withdrawal of the Odessa transit network to a qualitatively new level, therefore we propose to right away provide all possible solutions to meet the needs of all categories of citizens.

The proposed idea will make life easier for people not only blind and visually impaired, but it is also convenient for such stops, where there is always a large flow of people waiting for transport, because people will not be crowded and will know when they should approach the point of arrival.

**THE PURPOSE OF WORK** is to improve the functioning of urban passenger transport with the use of

smart-innovations to meet the needs of all categories of citizens.

## RESEARCH METHODS

Methodological and informational basis of work are scientific works, materials of periodicals, Internet resources.

## RESULTS

The actuality of the proposed solutions is that the Concept of the implementation of a modern model of functioning of urban passenger transport and project "On the introduction of an automated payment system for the payment of fares in the city passenger public transport of Odessa" [3], which is capable of making qualitative changes for the population, are already adopted, but it is not possible to foresee all aspects, for instance the Concept does not pay attention to the needs of visually impaired passengers. The Concept involves the installation in the vehicle, among other things, onboard computer, which processes the status of all devices, determines by GPS position and transmits data to a mobile single operator. Therefore, we propose to upgrade vehicle stops with speakers, which will report the numbers of approaching vehicles (for example, arrival time of 5-10 minutes). Thus, you can broadcast information on where the vehicle is and how long it will take to stop not only on the monitors at the stop, but also on the loudspeaker.

The main objective of such Smart-stops is to allow visually impaired people to be equally eligible for urban passenger transport. The main advantages:

– facilitating the use of urban passenger transport by visually impaired passengers;

- the variety of implementation depending on the budget and goals.
- ability to broadcast advertising information;
- reduce the risk of non-acceptance of innovations in the transport sector by the population;
- the implemented system in the future may be implemented in the mobile application, which can also be





supplemented with information about traffic (replacing Yandex.Probki), the scheme of possible transfers, etc.;

- allows to coordinate actions of people in emergency situations.

As it is said before, it is not necessary to equip additional equipment, it is only necessary to upgrade the stopping of transport. We offer 4 variants (table 1).

Table 1

## Proposed solutions

An example of a future look	Advantages and Disadvantages
The first option – A street hanging loudspeaker with Bluetooth, 3G, Wi-Fi, GPS.	
	<p>The cheapest option – provides only for placing at the stops (under the roof, directed inside the stop) a waterproof speaker with support for Bluetooth, 3G, Wi-Fi, GPS. The cost of this device – from 300 up to 2000 UAH. Most of them involve work from the network, so it is additionally worth the installation of solar panels (500-1000 UAH.)</p>
The second option – A street hanging loudspeaker with Bluetooth ... with a camera	
	<p>It differs from the previous presence of a video recording device. Such a decision will firstly significantly reduce the acts of vandalism in relation to devices, and secondly, will allow the fixing of passenger traffic and, third, will reduce the criminal situation. Cost: 1500-4500 UAH, solar battery – from 1000 UAH.</p>
The third option – the built-in loudspeaker in the forecast board for the arrival of transport	
	<p>This solution is possible with an organized rearrangement of existing stops. The built-in loudspeaker is the cheapest option (the cost of the device is 250-600 UAH.), does not require additional power from the mains, as it will work together with the whole design.</p>
The fourth option – the built-in loudspeaker in the Terminal for replenishing cards and buying tickets.	
	<p>As in the previous version, we are talking about the upgrading of future systems. In this case, if the equipment will be purchased by the city, the manufacturer (for example, TELECARD LTD) should put the task of embedding the loudspeaker with the function of receiving the GPS signal from the passenger transport. If under other conditions (free of charge, barter), this may be one of the technical requirements for such equipment.</p>

As a rule, when final contract for the supply of such equipment, installation of it is free (at the expense of the manufacturer). It's worth taking into account that in all devices you can predict the broadcast of advertising

information. Thus, when granting a company permission for the placement of terminals on a royalty-free basis, it is necessary to calculate alternative costs and incomes.

**CONCLUSION**

Depending on the option chosen, the implementation plan may vary: The first, second and fourth options – the installation (with the move to the next stop) will take about 30 minutes. Thus, one brigade per day can set 15-17 devices at a stop.

According to Odesgorellektrotrans ([www.oget.od.ua](http://www.oget.od.ua)), approximately 360 stops (trams, trolleybuses) are in Odessa, but this figure can be reduced: preliminary (it is necessary to specify how many route taxi passes this route), 80 of them can be excluded, because at these stops only one tram route takes place (unlike trolleybus, where taxis and buses stop), thus: on average one brigade can convert all stops within 18 working days. If you adjust the force majeure circumstances and the distance between the routes - up to one month.

The third option – depending on the complexity of the re-equipment of the entire stop (from 2 stops per day).

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