# MOSCOW INSTALLS SMART PARKING SYSTEM SENSIT ✳

Recently, 1.000 on-street parking bays, situated in the most challenging infrastructural part of Moscow, were equipped with the smart parking sensor system SENSIT from Nedap. SENSIT has been selected as the best performing system in the industry after an intensive procedure of field tests by Moscow's government. Nedap's parking sensor system is integrated with the parking management software for parking reporting, guidance and payments from Aksioma. Last month, this on-street parking solution was awarded as the Russian "Project of the Year" in the Transportation category.
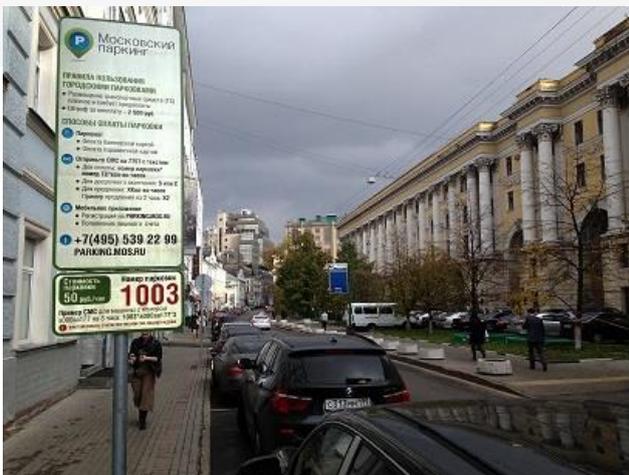
Moscow is one of the cities with the most congested streets in the world. Especially in the heart of the city, the part of the center situated inside the Boulevard Ring, the traffic and parking situation is extremely critical. To decrease congestion and to increase safety on the streets of this challenging part of Moscow, the city council decided to make available parking spaces easily findable.

The best tested system
Moscow's project team wanted to start the project by monitoring the usage of on-street parking spaces in the most challenging part of the Russian capital. For that reason, they decided to find a parking sensor system that shows an outstanding performance in this specific area. After an intensive field test selection procedure, Moscow's authorities concluded that Nedap is the manufacturer of the most robust and accurate sensor hardware and offers the most reliable communication network for on-street parking with its SENSIT system.

Very specific requirements
SENSIT technology consists of wireless parking sensors that detect in real-time whether or not a single parking bay is occupied and how long it has been occupied for. Nedap has installed SENSIT on 1.000 parking bays in the heart of

Moscow, the part of the center situated inside the Boulevard Ring. This area is known as one of the most complex places in the world to install an on-street parking sensor system. For that reason, the following very specific requirements were requested:

- Busy streets and high volume traffic movements from cars, trolley buses and underground metro and trains. Thousands and thousands of events are generated in the wireless sensor network. Smart filtering and efficient communication protocols should keep the system running even under the most challenging circumstances.

- On-street mounted sensors are continuously exposed to a variety of extreme conditions. The sensor must remain operational under snowy, wet and dusty conditions. Additionally, physical pressure from vehicles, buses and snow plows should not result in sensors failing or breaking.

- Good quality parking data is the core of any effort to optimize parking. Occupancy data from on-street parking sensors has to be set up in a transparent way, should be available in real-time and should support common standards for data integration.

- City streets cannot be closed off or badly accessible for many days while the sensor network is installed, since this would have huge impact on the traffic flow in the city. Therefore, any system that has to be installed in a city is required to be easy to install and setup, to be highly scalable and robust.

Intelligent sensor system technology
SENSIT is a parking sensor technology that consists of wireless sensors located in the ground and a communication network that has been specifically designed for on-street

parking in cities. SENSIT uses a multi-hop protocol based on time division. The networking protocol that was specifically developed for this application, contains self-configuring and self-healing elements.

 The floor mounted sensors constantly communicate with each other and, preferable, with relay nodes that are within reach. Relay nodes are used to offer alternative communication paths when the car park is covered in metal from all the cars that are parked there. It also limits the number of hops used for communication, which makes the system much faster and reliable. The communication network is bidirectional. Packages are numbered so they can be retrieved when they are lost. Performing firmware updates inside the sensors is possible by using the wireless network. The data collector allows bidirectional network communication. A queuing mechanism ensures the network to remain operational, even in case of power failure. Upgrades of sensors or the communication network can be realized centrally, every time of the day.

Parking management software in use

Real-time parking occupancy and parking duration data from on-street sensors are integrated with the parking management system from Aksioma. This Russian IT company was chosen to develop the management software for parking reporting, guidance and payments. The software is used to create analytical reports on employment, to increase the turnover of parking spaces, and to transmit information to the guidance signs, located along the streets near the Boulevard Ring in the Russian capital. Additionally, a smart phone app is available for motorist to make parking more efficient. The app is connected with the city's payment system. This mobile application informs motorists about the availability, costs and capacity of parking bays. Furthermore, it enables motorists to remotely start and end a parking session, including payment.

Impressive project results

he first results are impressive and the parking solution has been awarded as the Russian "Project of the Year" in the category Transportation, last month. The ambition of the Moscow City Counsil is to reduce congestion and create safer streets, by implementing the innovative parking solution. The project shows positive initial results. The number of parking violations is reduced by 64%. The turnover of parking spaces has increased 4 times as result of an increased number of parking movements. In the past, parking spaces were occupied for 6-8 hours. After installing the system, parking bays are now in use for approximately 1.5 hours each car. This means that the number of parking spaces a more intensively used by more cars for short-stay parking, which is very interesting for local shop owners. The "Project of the Year" award is an initiative of GlobalCIO to support the modern Russian IT industry.

Smart parking with Nedap SENSIT

A clever sensor technology is available to make on-street and off-street parking spaces easily findable for motorists. This high-tech system, called SENSIT, is developed and manufactured by the Dutch company Nedap. SENSIT consists of wireless parking sensors which detect in real-time whether or not a single parking bay is occupied and how long it has been occupied. Real-time parking information results in less congestion, reduction of emissions and safer streets and thus a more attractive city for visitors.

For almost twenty years Nedap is considered an expert in advanced and effective solutions for vehicle identification and vehicle detection. SENSIT was awarded for its product innovation at Intertraffic Amsterdam in 2006. Since that day Nedap has been focusing on designing the most accurate sensor hardware and the most reliable communication network using wireless sensor nodes. Intensive field tests, held by authorities of major cities, conclude that SENSIT offers the most robust and accurate sensor hardware and the most reliable communication network for outdoor parking available in the industry.

Nedap has designed the solution to be easily integrated with third party systems for parking guidance and traffic management systems, way finding apps and enforcement equipment that are used by major cities all over the world.