



Finding a parking space in a busy city can be a nightmare - it is also a leading contributor to traffic congestion. Knowing when an on-street parking space is free then notifying drivers of the available slot was the challenge that Plextek was set by a client deploying a parking system in Moscow.

Plextek's solution was to bury sensors in the parking spaces then communicate by radio the state of the sensors, either an "occupied" or "unoccupied" space, to a network of matrix boards around the city guiding drivers to free parking spaces.

A number of sensing methods were investigated. In the end, Plextek settled on a magnetometer as the primary

sensing technique and an optional light sensor. However, these sensors alone were insufficient to detect reliably the presence or absence of a vehicle as neighbouring vehicles, passing vehicles or parallel parked vehicles could produce false results. Signal processing algorithm development, threshold manipulation, self-calibration and extensive testing was required to achieve the false trigger rate specified by the client.

The sensors had to cope with a wide temperature range and road conditions, such as a typical heavy snow fall during a Moscow winter. Furthermore, the sensors had no external power supply, so they were inherently designed to operate on the internal battery with a five

year minimum lifespan. A closely integrated team of design and production engineers was formed to ensure all system performance expectations and cost targets were met.

Plextek was also responsible for the design of the radio base station that gathered the sensor data. The radio communications design itself was a challenge as the top of the sensor had to be flush with the road surface - making the antenna especially difficult. A suitable frequency band and transmission protocol had to be selected that allowed a relatively sparse network of base stations to be used to save cost. Our long experience in radio technology and systems allowed us to come up with a cost-effective, compact and robust solution.