SEMTECH CASE STUDY



MOKO SMART

LoRa®-Powered Smart Parking Brings Precision Occupancy Management to Three Continents

MOKO SMART's LW009-SM LoRaWAN parking sensor, powered by Semtech's LoRa® technology, replaces error-prone manual parking management across urban parks, government-designated spaces, and commercial forecourts in the UAE, Spain, and Panama.

QUICKFACTS

Company

MOKO SMART
www.mokosmart.com

Customer Profile

MOKO SMART is a leading IoT device manufacturer specializing in LoRaWAN-based sensors, trackers, and gateways. With over a decade of wireless expertise, MOKO SMART develops end-to-end IoT hardware solutions for logistics, smart cities, industrial monitoring, personnel safety and asset tracking serving enterprise customers across global markets.

Objectives

- Eliminate manual parking monitoring across high-volume, error-prone environments
- Deliver real-time occupancy data to parking managers and end users
- Detect and deter misuse of designated parking spaces
- Accurately track vehicle arrival times, departure times, and parking durations
- Deploy a scalable, low-maintenance outdoor solution requiring minimal infrastructure

Results

- 99%+ detection accuracy achieved using combined radar and geomagnetic sensing
- Real-time occupancy status mapped across entire parking lots
- Vehicle arrival times recorded within seconds; departure times logged automatically
- Parking duration tracking enabled for commercial and compliance use cases
- Scalable LoRaWAN® deployment covering expansive facilities with minimal gateway infrastructure
- IP68-rated enclosure delivering reliable performance in outdoor environments

Products and Services

- Semtech's LoRa Connect™ SX1262



> LoRa® technology has enabled MOKO SMART to deliver reliable, low-power, and long-range IoT hardware solutions across various industries such as asset tracking, personnel safety, and environmental monitoring. By leveraging LoRaWAN®, our customers are able to deploy scalable IoT networks with lower maintenance costs and improved operational efficiency, even in challenging environments.
>
> **Jerry Li,**
> *Co-founder at MOKO SMART*

INTRODUCTION

Parking is one of the most persistently inefficient aspects of urban mobility. Whether in a busy city park, a government-managed disabled bay, or a commercial forecourt, the gap between available spaces and drivers who can find them costs time, creates congestion, and in cases involving reserved spaces, can have direct social and legal consequences.

MOKO Smart developed the LW009-SM, a wireless surface-mounting parking sensor combining microwave radar and geomagnetic detection to bring real-time, data-driven precision to parking space management. Powered by Semtech's LoRa® technology, the LW009-SM communicates over LoRaWAN's long-range, low-power network to deliver live occupancy data to cloud platforms and end-user applications. Three deployments across the UAE, Spain, and Panama illustrate the breadth of environments where this solution addresses a common but costly problem.

CHALLENGE

- **Urban Park Congestion:** A public park in UAE city Centre manages hundreds of parking spaces and experiences capacity-level traffic within minutes of peak hours opening. With no digital monitoring in place, staff relied entirely on manual methods to identify vacant spots, a process too slow and too error-prone to keep pace with demand. Drivers circled the facility endlessly searching for spaces, generating traffic congestion that spilled beyond the park and into surrounding roads.
- **Disabled Parking Misuse:** The Spanish Government faces a persistent enforcement challenge with off-street parking spaces designated for disabled users. These limited spaces are routinely occupied by non-disabled drivers, forcing those with genuine need to park illegally elsewhere. Without automated detection or real-time monitoring, enforcement relied on physical patrol resource-intensive, inconsistent, and easily evaded.
- **Commercial Parking Metrics:** A gas station in Panama needed accurate, automated tracking of parking activity on its forecourt, specifically the number of vehicles present at any given time and how long individual vehicles stayed. Manual observation could not provide the consistency or granularity required to optimize space allocation and improve the customer experience.

Across all three deployments, the same underlying problem applied: as parking volumes grow, manual methods fail. They require more human resource, generate errors under fatigue, and provide no real-time feedback for operational decision-making.



SOLUTION

MOKO Smart deployed the LW009-SM LoRaWAN Parking Sensor, a compact, surface-mounted vehicle detector designed for installation directly on individual parking spaces. The device combines two detection technologies: a three-axis geomagnetic sensor that detects the magnetic disturbance caused by a vehicle's metal body, and a microwave radar sensor that confirms presence through motion and distance measurement. Together, these dual-detection modes deliver 99%+ accuracy in identifying whether a space is occupied or vacant.

Each sensor transmits occupancy data over a LoRaWAN network to an IoT cloud platform, where parking managers access a real-time map of space statuses across the entire facility. The architecture is straightforward: LW009-SM sensors connect wirelessly to LoRaWAN gateways, which forward data to the cloud platform and on to the management application. Powered by Semtech's LoRa® chip, the sensors operate across long distances from a small number of gateways making deployment across large, open parking areas practical without dense infrastructure.

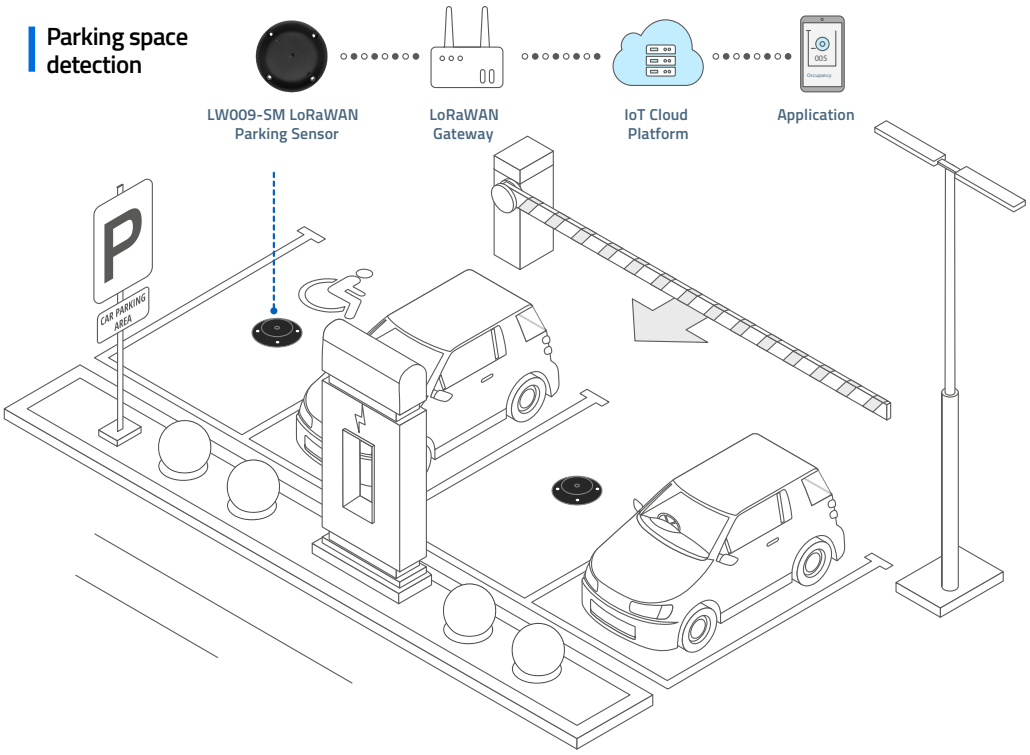
Beyond simple occupied or vacant status, the sensors log vehicle arrival times within seconds of a vehicle entering space, and record departure times when the vehicle leaves. This enables precise calculation of parking durations relevant for pay-by-duration facilities, compliance monitoring of time-limited spaces, and commercial analytics at sites like the Panama gas station. The LW009-SM carries an IP68 waterproof rating, making it fully suited to the outdoor environments of urban parks and open-air forecourts across all three deployments.

BENEFITS

- **High-Accuracy Detection in Real-World Conditions**
  The combination of microwave radar and geomagnetic detection delivers 99%+ accuracy far beyond what manual observation or single-technology sensors can achieve across varied vehicle types, weather conditions, and lighting environments.

- **Real-Time Visibility for Managers and Drivers**
  Live occupancy data is available instantly to parking managers via the cloud platform and to drivers via connected applications, eliminating the circling behavior that generates congestion and frustration.

- **Parking Duration Tracking for Commercial and Compliance Use**
  Automatic logging of arrival and departure times enables time-based enforcement, pay-by-duration billing, and commercial analytics capabilities that manual processes simply cannot deliver at scale.
- **Scalable Coverage with Minimal Infrastructure**
  LoRaWAN's long-range characteristics mean a small number of gateways can cover an entire parking facility. Expanding coverage as a facility grows requires adding sensors, not rebuilding network infrastructure.
- **Outdoor-Ready, Low-Maintenance Hardware**
  The IP68-rated enclosure protects the LW009-SM in the outdoor conditions typical of urban parks, open forecourts, and roadside deployments reducing maintenance requirements and extending operational life.
- **Adaptable Across Diverse Deployment Contexts**
  The same hardware and network architecture addresses fundamentally different use cases congestion management, social equity enforcement, and commercial analytics demonstrating the versatility of a LoRaWAN-based approach to smart parking across geographies and operator types.



About Semtech
Semtech Corporation (Nasdaq: SMTC) is a leading provider of high-performance semiconductors powering AI data center networking, IoT connectivity and intelligent connected devices worldwide. Our global teams are committed to empowering solution architects and application developers to develop breakthrough products for the infrastructure, industrial and consumer markets.

To learn more about Semtech technology, visit us at Semtech.com or follow us on LinkedIn or X.

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