



**IPsens, LLC.**  
**Web-Based Vehicle Counting**  
**System**

**Patent Pending**

## About Us

IPsens, LLC was initially founded as Frontline Systems in 1975. We bring close to three decades of experience in designing and implementing integrated parking management systems, starting with the development of the first integrated on-street parking revenues and enforcement system for the world's largest parking meter manufacturer in the early 1990's. Our sales and hardware support offices are located in Branson, MO with our software development offices located in Kalamazoo, MI.

The partners of IPsens, LLC have implemented large scale systems in Parking Enforcement, on-street vehicle occupancy in cities such as NYC and others, and have designed and implemented numerous other integrated data management systems in the Transportation and Security Industries. We currently support 27 cities and universities both large and small. Software developed by us still run systems like:

- NYCPD Parking Enforcement System, with over 2000 officers using our hand-held equipment and software to write citations every day.
- NYCDOT Parking Meter Maintenance, all on-street parking equipment outages and repairs are noted on our system and the information is integrated with the NYCPD ticket issuance process.
- NYCDOT Coin Counting, all collected coin revenue is sorted, counted and reconciled with meter collections using our system.
- NYCDOT Parking Availability pilot implemented in January 2012, using Nedap parking sensors which have survived 3 tough winters in very marginal road conditions.

As a testament to customer service and product quality we were recently awarded a new 7 year contract, this will run as an extension of our long standing Parking Enforcement Technology contract with NYPD. This contract includes the challenge of developing new leading edge enterprise level software based on an enhanced web connected platform along with a new 21st century hardware solution.

We bring a well-rounded background in the development of data managements systems designed to comply with an open systems architecture, allowing the customer control of their systems and data while offering the maximum integration possibilities with new or existing third party data systems. IPsens has recently founded the IPsens Data Alliance as a means to certify other 3rd party solutions into our data management system. This is a true commitment by our company to not limit future opportunities for our users to whatever we can offer at any given time, but to embrace it and create one uniform data platform to house it all.



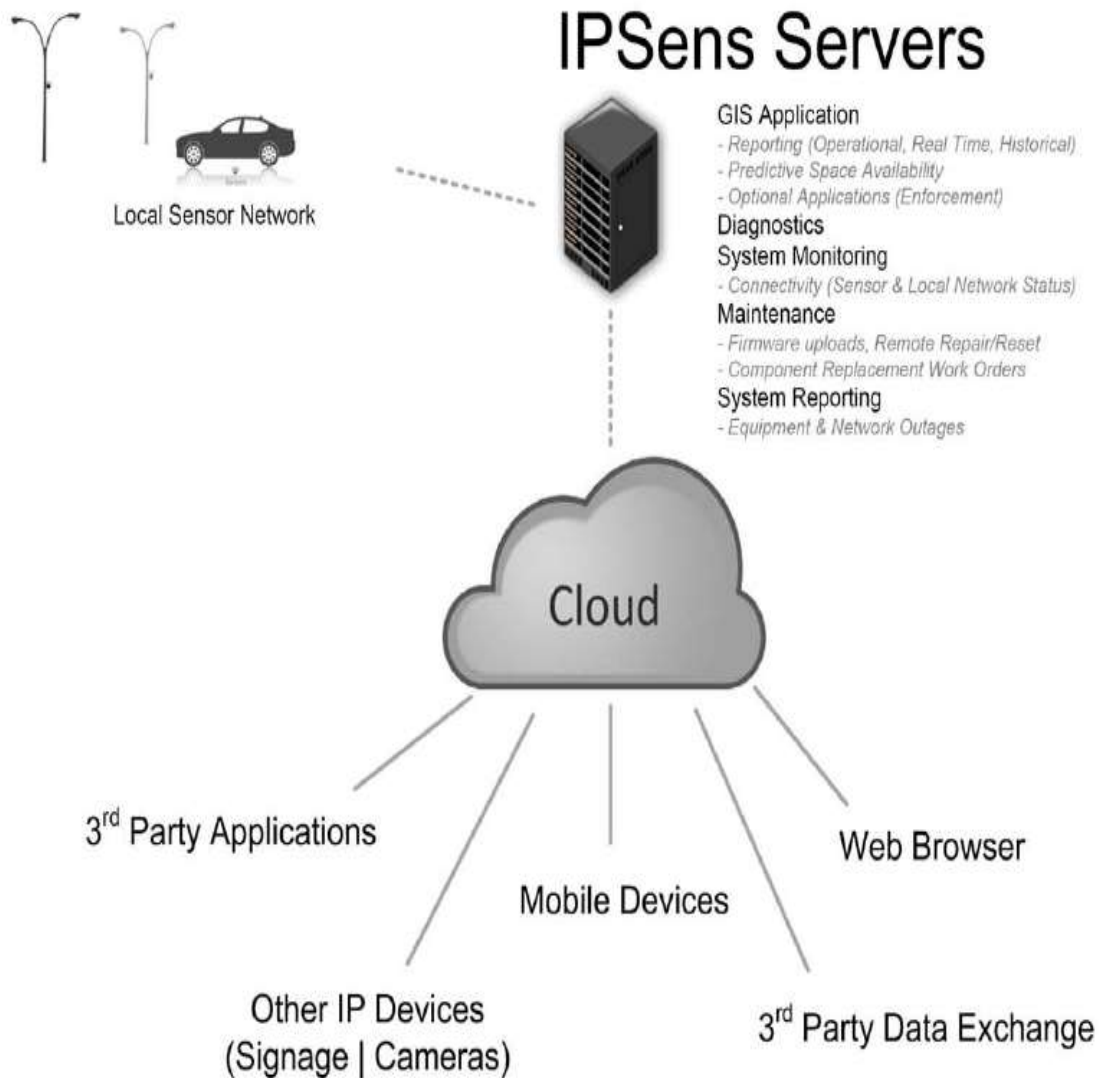
## Web-Based Vehicle Counting System

The IPsens vehicle counting system is available for off-street parking in many different designs, each of which address particular needs or budget considerations. The system is scalable and can be implemented on a smaller “Local” counting scale, with sensors counting vehicles in each entry/egress lane and between levels in a multi-level structure to a completely “Global” implementation, with sensors monitoring occupancy in particular zones of a parking lot or structure, in areas such as reserved parking, handicap parking, permitted parking, or vehicle charging stations.

Systems are designed to be a part of central data Hub which integrates and distributes data among all of the IPsens systems’ components and other third party compatible systems: Web browser applications or mobility applications such as pay-by-phone, space-finding applications, parking reservations and many more emerging technologies.

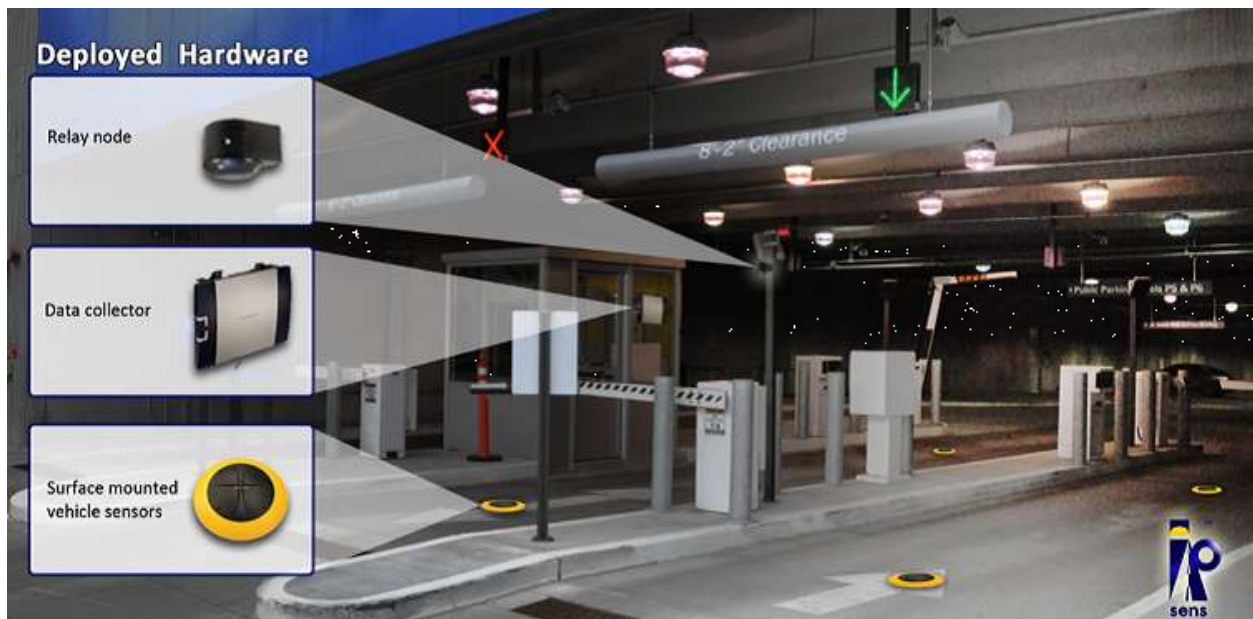
## General Network Architecture

Figure 1



## Functional System Description

Figure 2



Each lane of the parking garage is equipped with two surface-mounted vehicle sensors, each sensor is connected wirelessly either directly to a Data Collector or to a Data Collector through a series of wireless Relay Nodes.

The Data Collector acts as the connection to the Web-Based data hub from each entry/egress location. Each Data Collector is connected through GPRS cellular communication.

The incoming data from each ingress/egress lane will be relayed through the Internet to the IPsens Host Server. The customer has ownership of all the data and management reporting that flows through the system. The IPsens host runs the calculations on all vehicles entering and leaving the facility or leaving one level and going to another. This information is relayed to our GIS map server that shows current availability/occupancy at every customer location connected to the Host.

The IPsens vehicle counting management tool provides extensive diagnostics functionality allowing the system to automatically monitor all sensor hardware, with the ability to report sensor node or other hardware outages in real time, granting the customer to immediately address maintenance and/or repair issues.

All sensors are battery powered and feature an expected battery life of 2.5-3 years for this type of application, the in-lane sensors are replaced at the expiration of life. This design has been chosen to provide optimal operating performance and weather integrity of the sensor housing throughout its lifetime. The sensors are surface mounted and are easily replaced once the batteries are depleted. All other network components feature either replaceable batteries or direct low voltage line power and require no replacement of equipment.

The following represents a complete list of the reports and operational functions that are managed through the IPsens Host:

- Operator Dashboard
- Web browser access to site Occupancy/Availability Data Map (GIS)
- Compiling of all historical Occupancy data
- Compiling of all occupancy data
- Output to electronic signage on site
- Securing remote server from unauthorized access
- Real time Sensor System Hardware Monitoring and Diagnostics
- Remote re-programming of all Sensor nodes and network components
- Remote Manufacturer 2nd level hardware support
- Remote hardware trouble shooting labor
- Configuration, installation and support of initial network service
- Hardware firmware updates to all hardware as it is released
- Updates to Hosted interface as it is released

## LED Signage



The IPsens Host also manages all communication to on-site parking signage, which is an integral part of our offering. Our sign elements can be incorporated into standard single or multiple layer traffic signs.

Sign elements can be integrated to show single or multiple levels of parking availability data, by adding additional elements to a standard sign identifying each level or area. All signs are IP compatible and are connected to the IPsens Host through an on-site switch and Internet router along with the Data Collectors reporting data from the sensors.

The systems' design can also be configured to have signage reflecting availability of special use spaces within a parking lot or facility for areas designated for reserved parking, handicap parking, permitted parking or vehicle charging stations. When such areas are equipped with the required sensor hardware.