Smart City

The Smart-City concept

A Smart City is an urban environment able to actively improve life quality. Smart City can facilitate life and satisfy the needs of people, companies and organizations, thanks also to the widespread and innovative use of TIC, especially concerning communications, mobility, environment and energetic efficiency.

Innovative Technology

Thanks to the employment of innovative radio technologies, it is now possible to design and produce very small wireless sensors which can be either wearable or included in city infrastructure with negligible impact. These sensors can measure several parameters and send data readings remotely; alarm functions are also available on each sensor and can be remotely transmitted as well.
By installing data collectors (Gateways), within a Smart City it is possible to collect data from all sensors belonging to a well-defined sensor network and manage them remotely.
Another feature of this product is versatility, thus allowing gateways and sensors to be installed in several environments for many different applications.
The parking meter system belongs to the set of systems and infrastructures composing a Smart City.

The following projects are currently active and running:

- General purpose multi-technology Cuby gateways
- Smart Lamps with integrated receivers - Vegaled
- Data receivers to be deployed into already existing structures, such as lamp posts, traffic lights, etc.
- Wireless sensors with STE proprietary trademarked technologies – Micro.Sp, 169MHz

The receiving gateway (Cuby) is designed to receive data from the following sensors:

- 169MHz Parking Sensors with magnetometer
- Smart Lamps
- Gas or water meter sensors
- Air quality sensors
- Vehicle monitoring sensors for traffic management
- Movement sensors to activate/deactivate lighting
- Other monitoring sensors (temperature, humidity, vibration, etc.)

All the above sensors belong to the wireless infrastructure, made by STE, named **"Sp.Net"**.

sp.net
wireless sensors

The Sp.Net: network evolution
Any sensor or object of any size can be part of Sp.Net sensor network. The key features of Sp.Net are the possibility to easily integrate itself in any environment and the capacity to self-configure according to different needs.

Sp.Net is....Parking management
Thanks to extremely performing sensors it becomes possible to put in place a network to wisely manage and control parking lots and traffic flows. The sensor can be installed either underground, hidden underneath the pavement, or glued to the pavement at street level.

Sp.Net is.... Internet of Things
Internet of Things is the new wireless frontier. Everything will be manageable from remote simply by a click. Sensors connectivity is the key issue here. Today, CUBY is the right answer to all connectivity needs.

Sp.Net is.... Smart City
Within urban environment, Sp.Net assures the right integration between multiple technologies, allowing to satisfy multiple needs. Thus is it possible to integrate in the same system different types of sensors, which use different communication methods.

Sp.Net is.... Bulding automation
Micro.Sp low consumption technology, along with CUBY flexible scalability, enables the final user to easily and quickly realize a huge amount of home automation applications.
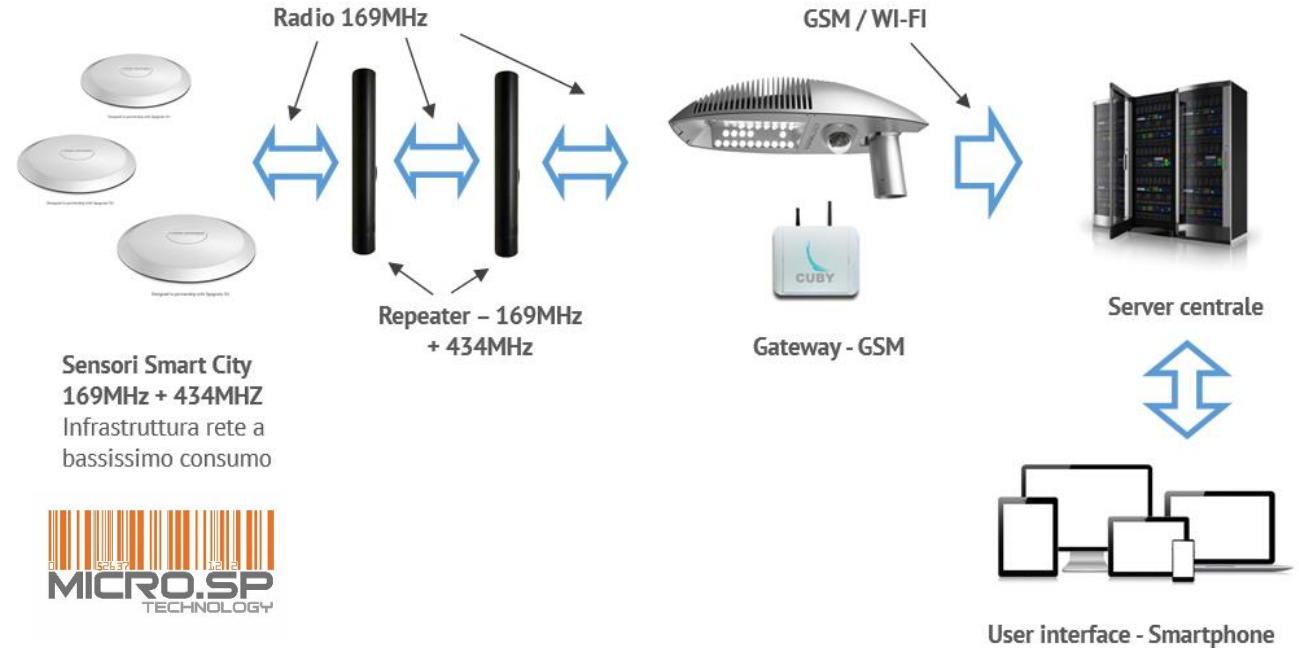
Sp.Net: network evolution

Sp.Net is the new multi-technology sensor network produced by STE.
Thanks to Sp.Net you will be able to create your own wireless infrastructure with just few easy steps while saving your money.
Sp.net can include different solutions such as low-consumption Micro.Sp systems, ZigBee sensors, Bluetooth and Wi-Fi which can be managed just by one fully integrated Gateway perfectly equipped to handle everything at its best. With Sp.net you will be able to control any kind of sensor within any environment.
A wide range of applications which go from small home sensors to bigger urban systems as well as more sophisticated use, such as checking wheel pressure through a sensor placed into the tyre which sends data directly to your smartphone.
Any object, no matter whether big or small, can be part of your sp.net network.

Sp.Net advantages in urban environment

Sp.Net technology has many advantages.
One of the most important is that it can be implemented quickly and easily even in the most complex urban environments.
Sp.Net can manage any infrastructure as it integrates many subsystems: 169MHz, 2.4GHz Wi-Fi or Bluetooth, as well as very low energy Micro.Sp consumption systems (more information on www.stecom.com) or 434MHz interfaces.
Every part of the system is managed dynamically and in real-time.

Smart network infrastructure

To design and develop a wireless network inside a urban environment is often a very complicated task.
Typical problems are due to the strict requirements in terms of performance, battery duration and low power consumption while maintaining the desired efficiency.
Furthermore, the ability of the transmission system to offer good performance even in case of obstacles (walls, buildings, trees, etc.) is often the key factor of a successful solution.
Most wireless systems are battery-powered, thus one of the most challenging issues is to offer good performance while keeping battery duration as long as possible in order to avoid frequent battery replacements.
Network infrastructure is composed by wireless sensors that communicate with a gateway, either directly or through one or more repeaters. The repeaters, which can be installed on lamp posts or on traffic lights, receive data from sensors and send it to the gateway.
The gateway can be installed inside the lamp or outside of it. The gateway collects data from sensors and sends it to the central server via GSM/GPRS.
With the aid of a dedicated user interface, users can easily visualize data via smartphone, tablet or PC.

Radio 169MHz

GSM / WI-FI

Sensori Smart City
169MHz + 434MHZ
Infrastruttura rete a
bassissimo consumo

Repeater – 169MHz
+ 434MHz

Gateway - GSM

Server centrale

MICRO.SP
TECHNOLOGY

User interface - Smartphone

Smart city

sp.net
wireless sensors

Smart Lighting Management
Dynamic control and management of street lighting.
The gateway can be installed on the lamp post or integrated inside VegaLed lamp made by Spagnolo S.r.l.

Smart City Repeater
The repeater is a low cost solution to expand a wireless network, which allows spreading sensors over a greater area while maintaining full functionality. The system can be easily installed and is self-configurable.

CUBY

MICRO.SP
TECHNOLOGY

VOSystem

Traffic Management
By using magnetometer sensors, it is possible to monitor and manage vehicle traffic. The gateway can be installed inside traffic lights and is able to control vehicle flow dynamically.

Alarms and sensors
The sensors based on very low power consumption Micro.Sp technology can be integrated into Sp.Net. They have compact size and extremely high battery duration (more than 10 years) when supplied by a small 3V lithium battery.

Smart Parking
Vosystem is a subset of Sp.Net network. It is an innovative parking control system based on high performance magnetometer wireless sensors.

Magnetometer wireless sensor

WSN- Wireless sensors
Low consumption sensor to monitor temperature, pressure, vibration, light intensity, air quality, etc.

Management of ambulances and police vehicles
Sp.Net can also locate and guide ambulances and police vehicles in emergency cases by controlling traffic lights in order to assure them the shortest and easiest route to destination.

169MHz Social Alarms
Bracelets to monitor elderly people, people with Alzheimer disease, etc. 169MHz frequency band is reliable also for long distance transmission.

Smartphone App
Vosystem also includes a dedicated app for smartphone and tablet which allows the user to check in real time the availability and position of free parking places, guides the user to destination and manages the reservation of the selected place.

Gas & Water Meter
169Mhz systems for the remote reading of gas and water (based on Wireless M-bus).

Cuby: a new gateway concept

Cuby is the new multi-technology gateway designed by STE.
In few easy steps, with Cuby it is possible to create a high efficiency wireless network suitable to several possible environments, both urban and domestic.
A wide range of technologies with different sensor types can be managed simultaneously:
- Low consumption Micro.Sp sensors
- 169MHz sensors and Wireless M-Bus systems
- ZigBee or Bluetooth sensors

Furthermore, Cuby is provided with Wi-Fi connection, to connect to Internet and communicate with the central server, thus allowing a smart and easy control of every node which is part of the network system.

Multitechnology

Cuby has on-board all technologies needed for the accomplishment of typical wireless infrastructure focused on a wireless sensors network.
The system is able to simultaneously handle all on-board peripherals thanks to an extremely performant firmware.
In this regard, either managing mono-directional low-consumption sensors or controlling data collecting hubs within an urban environment it becomes simply possible and real. User friendliness and the expansion capability turn the CUBY into an essential choice should you wish to realize an highly professional product.

All in one concept

Cuby is an all-in-one platform including:
> Last generation radio receiving Micro-SP
> RTX Radio 169Mhz Wireless M-Bus
> Wi-Fi Module
> Bluetooth module
> RJ45 Interface
> USB connector
> GSM Module

SMART CITY & SMART PARKING

Within a future city it is essential to organize daily traffic for best efficiency and optimize parking management.

By implementing Sp.Net it is possible to manage quickly and easily parking systems, vehicle transit, automatic traffic lights control and supervise emergency situations such as accidents, roadworks or traffic jams.

The use of all of the above solutions improves significantly traffic flow and, in general, enhance living standards in urban environment.

SMART PARKING APP

The product also includes an app for smartphone or tablet.

The app visualizes a map of the area in which the system is installed (e.g. city district, public/private parking lot), displaying in user-friendly format the quantity of free parking places and their locations on the map.

Once the desired place is selected, the app guides the user to the destination.

The app has also the possibility to check parking availability in real time, notify the user in case the chosen place has been occupied and, in case, assist him/her in making a new selection and guide the user to the new destination.

SMART LIGHTING – VEGALED SPAGNOLO SRL

Street lamp becomes smart when Cuby gateway is integrated into it, because the gateway allows to read all data from every installed sensor.

Each street lamp is connected to another lamp or to a gateway/repeater.

The system can manage over 1000 lamps by using a dedicated wireless infrastructure.

In partnership with Spagnolo srl

CUBY

VOSystem

COMUNE DI GENOVA

**2013 - 2014
GENOVA INSTALLATION
SMART PARKING SOLUTION**

Where can i park?
Check it on your smartphone

Magnetometer Wireless Plate Sensor
STE has developed through the years two different parking sensors:

- Magnetometer embedded in-ground Wireless Sensor
- Magnetometer Surface Wireless Sensor

Both systems take advantage of STE proprietary technologies. Thanks to an extremely intelligent and flexible firmware the sensor can self-calibrate whilst calculating the temperature ratio.
All this results in a quite wise management of the magnetometer sensor.
The two sensor transmit data through an extremely efficient low consumption radio module at 169 MHz with narrow bands. These features guarantee quite a long life expectancy for the system: more than 10 years for the embedded in-ground sensor and 5 years
for the surface sensor.

169MHz TECHNOLOGY
The circuit board has been developed entirely by STE. Transmission frequency is 169MHz, with narrow channel bandwidth (12.5KHz).
169MHz frequency band is particularly suitable because it guarantees long transmission range, good permeability and high reliability even in the most critical urban environments.
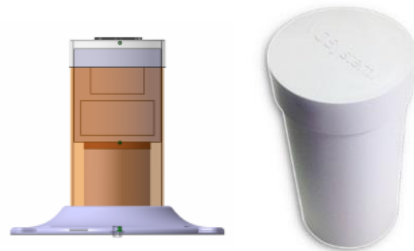
IN-GROUND MAGNETOMETER SENSOR

The in-ground sensor is installed under road surface and can be used to monitor either a parking place or vehicle transit in a certain zone.
Transmission range between sensors and gateway can be quite long (typically 100-150m).

SURFACE MAGNETOMETER SENSOR

The surface sensor is designed for a quick and easy installation on road surface. It is suitable for private, covered and indoor parking lots.

Designed in partnership with Spagnolo Srl

In the picture above, an installation of the surface mount sensor is shown. Each sensor monitors one parking place. The magnetometer can instantly detect whether a vehicle is parked in that place or not.
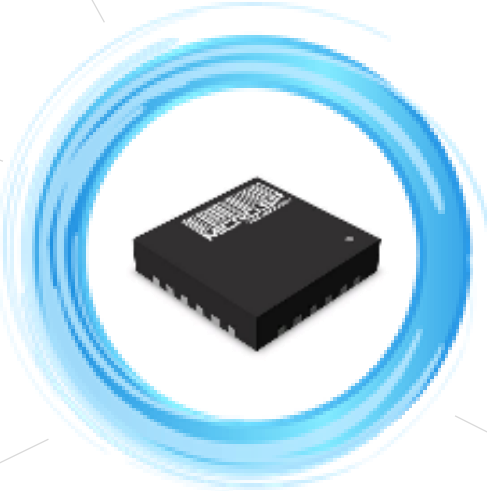
RFID Logistic

Health Care

Building Automation

Home Appliances

micro.sp is
Internet Of Things
this is SP.Net

Smart Parking

Tire Pressure

Spagnolo Srl

Engineering studio active since 1986, its headquarter extend across 4200 square meters offices. Spagnolo Srl is well known for its projects in automotive, lighting and medical sectors, with customers such as Fiat, Ferrari and Jaguar.

Ste Ksolutions

Company founded in 1964, specialized in wireless transmission systems and short range devices. During the past 10 years, STE has developed several applications and products related to the Internet of Things concept with particular focus on Smart City solutions.

Sp.Net e VOSystem

Sp.Net is an infrastructure designed for Smart City and home automation.
Sp.Net can host several different wireless infrastructures to control and monitor many types of sensors.
VOSystem is a subsystem of Sp.Net dedicated to the smart management of parking places and to the dynamic control of light sources inside urban environment.

Micro.Sp technology

Micro.Sp technology, developed and patented by STE, allows to develop small and ultra low power sensors which can be supplied by a small 3V lithium battery for a duration of over 10 years.
It is covered by 7 patents and has already been used for collaborations with many international companies.
Micro.Sp is the ideal solution for Smart City and Internet of Things projects.

SELEX
Sensors and Airborne Systems
A Finmeccanica Company

BRIDGESTONE

CANDY

ABB

FINMECCANICA

MAGNETI MARELLI

(i) INDESIT

RENAULT

Costa
CROCIERE

BITRON

Electrolux

MERLO

MARTEC
A member of the Lloyd's Register Group

SHITEK
TECHNOLOGY S.R.L.

Whirlpool

Pietro Fiorentini

LifeWatch
A Card Guard Company

Enel

CPL CONCORDIA
Group

SKF

TELECOM ITALIA

elster