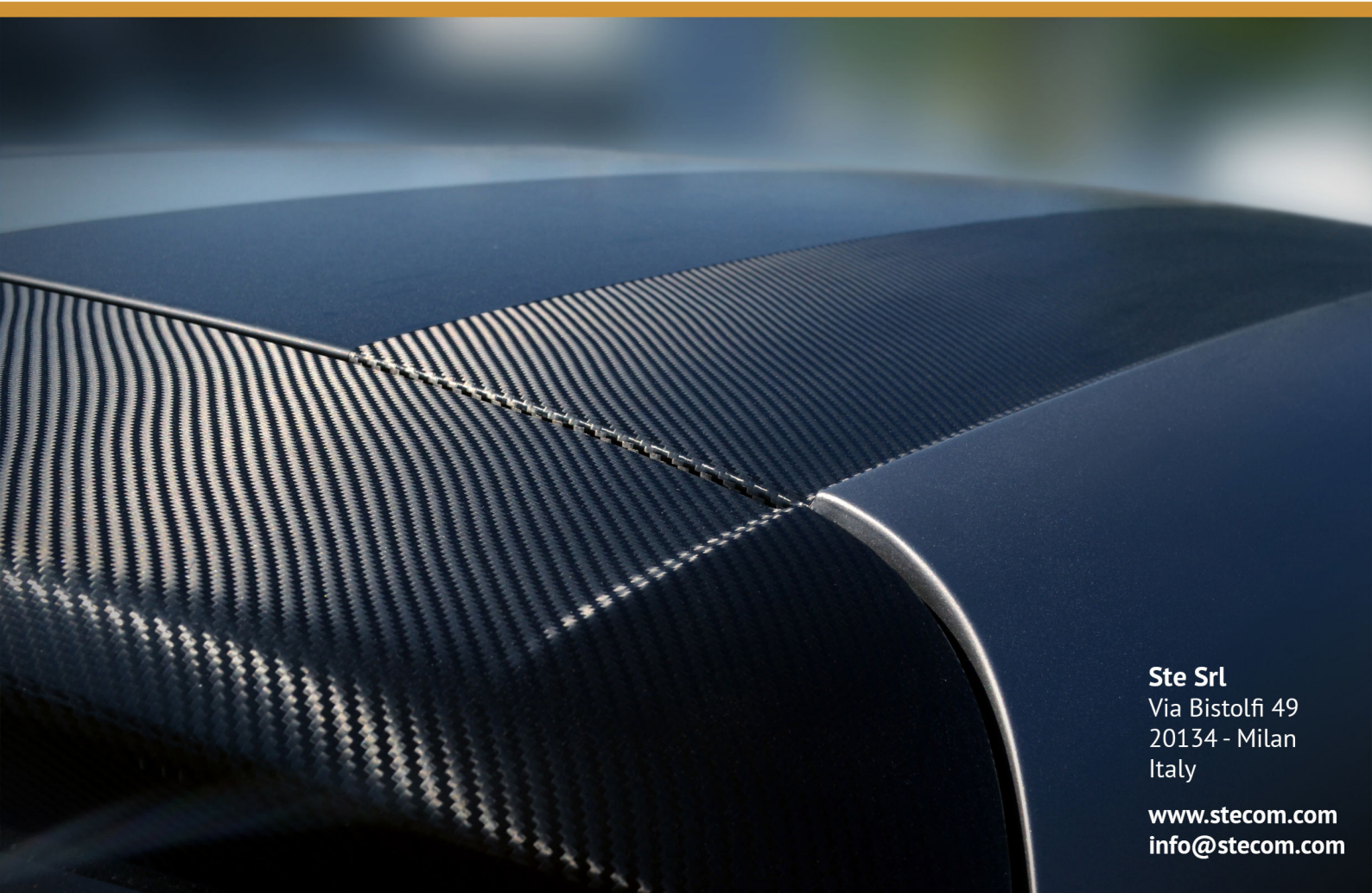




casehistory



Ste Srl
Via Bistolfi 49
20134 - Milan
Italy

www.stecom.com
info@stecom.com

Internet of Things

SpNet - Wireless communications between objects

“CONNECTING INNOVATION FOR INTELLIGENT WIRELESS”

Ste

Engineering Department
2014



system features

The Sp.Net: network evolution

Sp.net is the new multi-technology sensors 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 MicroSp systems, ZigBee sensors, Bluetooth and WiFi 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.



Cuby: a new gateway concept



Cuby is a new STE proprietary multi-technology concept.

With just few easy steps CUBY is able to create an effective sensors network at high energetic efficiency. A wide range of different sensors can be mounted within the same system: low consumption MicroSp, 169Mhz Systems, Wireless M-Bus, Zig-Bee sensors as well as Bluetooth.

Thanks to wi-fi connection Cuby becomes a hub of the internet network.

Cuby it's a new way of thinking wireless. Thanks to Cuby we can today focus on the application itself better than thinking how to technically achieve it.

Cuby is able to autonomously all the data exchange process among devices.

Thinking about new solutions and applications both B2C and B2B will be just a piece of cake. The system is supplied along with a web-server software which enables final user to manage all linked devices. You can also constantly check-up sensors status as well as manage alarms and events.

Cuby is an outstanding starting point to kick off your idea!



Micro.Sp Alliance

Micro.Sp: the enabling technology for a Greener and more Sustainable world.

The Micro.Sp Alliance develops and promotes a breakthrough in Energy Efficient Wireless Sensors (EEWS): based on the extremely advanced Micro.Sp technology, the new standard aims to contribute to enable the market of "Internet of Things" (IoT) and smartphone based applications as well as to monitor and control objects in the network.

Micro.Sp alliance delivers a new method of creating wireless sensors by using standard components normally available on the market, thus supporting the widespread of cost effective solutions for a large spectrum of applications.

The alliance's vision is to offer the highest grade of integration along with the most advanced solution for a cost effective approach to the business, contributing to reduce installation, operational costs and to reduce the environmental impact.

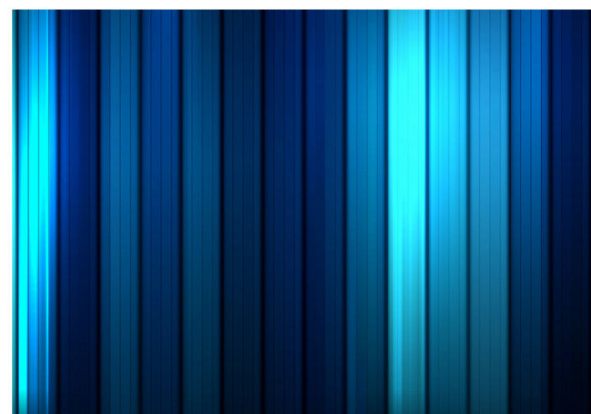
We believe in a greener and smarter world and our mission is to offer a new technology for everyone and everything.

The micro.sp technology

Link margin budget, extreme low power consumption and high peak power are among the requirements of a robust communication: Micro.Sp technology becomes a must when the wireless sensors are powered by small lithium batteries and the management of the energy delivered to the system is critical.

The Micro.Sp approach offers the highest grade of integration and the most advanced solution for a cost effective approach to the business, contributing to reduce installation and operational costs.

Soon after having introduced Micro.Sp concept, STE has increased its penetration of market sectors such as automotive and home appliances. High level of integration, extreme energy efficiency and solid know-how in software engineering are the key factors which consolidated STE position on the market.





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 used either hidden underground underneath the pavement or glued to the pavement at street level.



Bulding automation

MicroSp low consumption technology along with CUBY flexible scalability enable the final user to easily and quickly realize a huge amount of domotics applications.



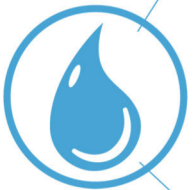
Smart City

WSN concept is tightly bound to the SMART CITY one. There are several potential applications suiting Urban environment needs : air quality control, Temperature control and lighting and proximity sensors. All this can be easily managed by few gateway located across the urban territory.



Internet of Things

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



Meter reading

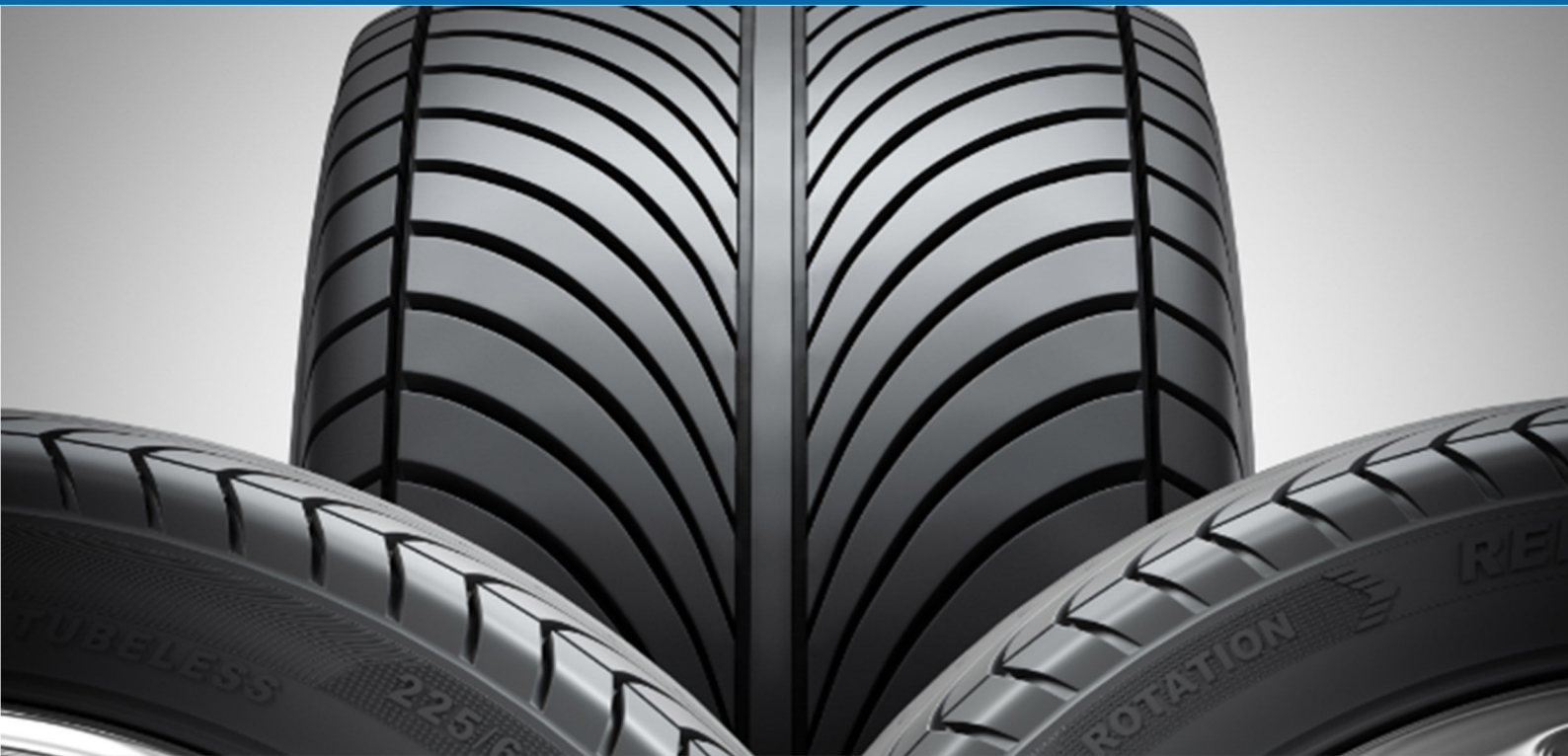
STE has been developing applications and meter-reading oriented products since more than 10 years. Today, thanks to the experience and knowledge gained through the years, CUBY can be used as a gateway compatible with Wireless M-Bus systems. Users can quickly collect and manage data transmitted by wireless nodes located across the territory.

fields of application

sp.net



the technology



A new way to thinking wireless

The new wireless Micro.sp® technology for its robustness, flexibility, economy and for the intrinsic ultralow energy absorption. It is particularly proved to be valuable for products related to areas of application such as Internet Of Things applications, Automotive, Home appliances sensors, Wireless sensors network, Smart City, Home building automation and many other. Micro.sp® opens up an innovative and previously unthinkable approach to wireless energy efficient low power sensor devices.

RF pulses

Short (2-3 μ s) RF pulses can be employed to transmit data in applications where an ultralow energy consumption is of paramount importance. The data are modulated into the transmitted message employing PPM (Pulse Position Modulation) techniques. One of the major limitations of current active wireless sensor devices is that they are battery powered. This means that they either have to be recharged or replaced periodically and that the energy delivered to the system could be relatively low. With an extraordinary high RF peak power and the extremely low mean current consumption, which are necessary conditions to design a reliable and robust RF link margin budget, the SPX machine contributes to the technology development across a multitude of areas of applications such as automotive, medical, security and logistic. And naturally leading to ubiquitous and energy efficient wireless sensors anywhere.

The Key concepts of Micro.Sp® Technology:

- > Ultralow energy consumption.
- > Low economic impact.
- > High flexibility enabling remote monitoring of any type of sensors.
- > Active RF remote detection.

Micro.sp® approach

EEWS as Energy Efficient Wireless Sensors

The enabling technology that could bring IOT to PERVASIVENESS must comply to:

- > Energy efficiency
- > Miniaturization
- > Cost



CLOUD SENSORS

There are many parameters that can be measured and wirelessly delivered to the receiver. The Sensors become integral part a wide range of object and appliances. They are extremely compact and powered by small batteries or energy harvester.



APPLIANCES SENSORS



SWITCH SENSORS



3 AXIS SENSORS



SOCIAL ALARMS



LEVEL SENSORS



LOGISTICS SENSORS



HUMIDITY SENSORS



PARKING SENSORS



LAMP SENSORS



AUTOMOTIVE SENSORS



HOME SENSORS



POWER SENSORS



METER READING



LIGHTNESS SENSORS



TEMPERATURE SENSORS



sp.net
wireless sensors



WSN

WIRELESS SENSORS NETWORK is a particular kind of network, characterized by a distributed architecture. It consists of a autonomous electronic devices that collects data from the environment and to communicate to another device. This device is the "Gateway".



GATEWAY CUBY

Cuby collects data from multi-technology sensors and manages them individually at the same time. It can be used both indoors and outdoors. It is a scalable solution and usable in different contexts. It can be powered by a solar panel, both by a battery or directly connected to the power line.



INTERNET

Cuby uses a Wifi technology and/or GSM to post to Internet the data collection and make them easily to access.

SmartPhone APP

Thanks to the Web server interface it's easy to access to the data . Thus you can manage the sensors of your wireless sensors network from any devices commonly used such as smartphone or tablet.



IoT sp.net network



internet



router



cuby gateway



Home wireless network could sometime be fairly complicated to realize. There could be many hurdles impacting on the system efficiency. In this regard **sp.net** is the right answer to bypass all these limits (walls, pieces of furniture, home appliances) and it can make difference between a winning solution and a weaker one.

One key feature of wireless systems is the power supply which comes usually through a battery. When it comes to long range transmission together with long lasting power then **sp.net** becomes the right choice for it perfectly meets these essential needs.

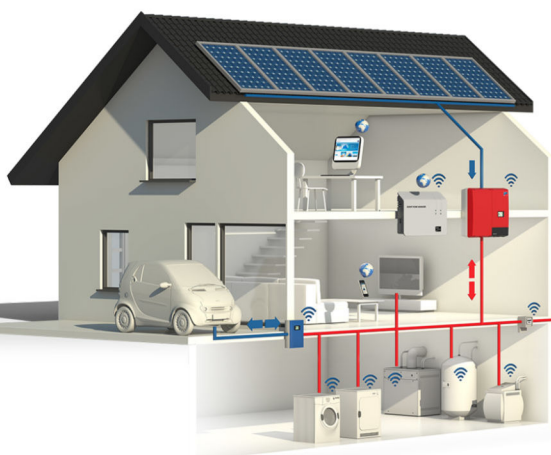
Wireless net includes tiny low-consumption sensors powered by very small lithium batteries which are able to grant a massively long lasting power (up to 10 years).
















On top of this, Micro.Sp sensors can achieve very good transmission performances. Despite their perfectly integrated, hence small, antennas they can cover up to 100 meters in an outdoor environment.

Thanks to **sp.net** you can easily and quickly set up a home sensors network to control and manage different variables such as temperature, pressure, vibration, air-quality, movement, lightings and many others.

The multi-technology sensors are wirelessly linked to a gateway: the "Cuby". "Cuby" is able to manage all sensors together and this can be done through a remote connection.

"Cuby", thanks to the wifi-board, becomes part of its own network though which it can easily access the world wide web. The application developed by STE can manage a constantly check all sensors placed within the home environment easily setting-up its own smart-network.



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AUTOMOTIVE SENSORS |
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HOME SENSORS | 
POWER SENSORS | 
METER READING | 
LIGHTNESS SENSORS | 
TEMPERATURE SENSORS |

your wireless sensors network

Internet of Things with sp.net

I vari sensori vengono poi visualizzati e controllati attraverso l'utilizzo di Smartphone e Tablet. Lo Smartphone può essere collegato direttamente al gateway Cuby oppure alla rete Wi-Fi interna. Grazie alla sensoristica wireless sviluppata da STE si potrà facilmente controllare lo stato dei vari elettrodomestici presenti nell'abitazione, oppure alzare o abbassare le tapparelle di casa, controllare la temperatura dei vari ambienti, controllare lo stato di pressione della propria vettura prima di mettersi in viaggio etc etc.



IoT sp.net Tyre pressure



Tyre pressure monitoring system

Short definition of Tyre Pressure Monitoring System (TPMS): The automotive electronics industry in the recent past has made many improvements in vehicle safety. One such fast growing application is the tire pressure monitoring system (TPMS). In simple terminology, TPMS is an electronic safety system that is used to monitor the air pressure inside the tires of a vehicle and provide the driver with a warning signal should an anomaly occur in one or more tires. Thus it is best referred to as a driver-assist system. TPMS is a short range wireless application where the transmitter and receiver are separated by a distance of 3m to 100m and typically use the frequencies between 300MHz to 960MHz. To be specific, the TPMS operates at the frequency of 315MHz or 433MHz.

The next generation

STE Engineering's research and tests show that the success of the ITS depends on the reduction of the average energy consumption. It must be of at least two orders less than existing approaches: this requires a system's energy consumption to move from a scale that ranges in terms of milliampere down to scale that is measured in nanoAmpere. And a more efficient PPM scheme seems to be the future step in ITS. The next decade of technological progress in the field of integration of electronics into tyres will witness a generational change in the way to approach system level design, with a natural replacement of traditional OOK, ASK or FSK modulation scheme in favour of a more reliable and energy efficient PPM modulation. This will guarantee efficiency not only in energy consumption and form factor integration, but also in facilitating the migration from standard battery cells to more efficient, reliable and compact energy harvesters.

Micro.sp as unique Value Proposition

Following to STE engineering research and tests, mandatory for the success of the Intelligent Tire System is the reduction of the average energy consumption, that must be of at least 2/3 orders less than existing approaches: this requires system's energy consumption to move from a scale that range in terms milliAmpere down to scale that is measured in nanoAmpere. And, in according to that same very experience, a more efficient PPM (Pulse Position Modulation) scheme seems to be the future step in ITS: the next decade of technological progress in the field of integration of electronic into tire will witness a generational change in the way to approach system level design, with a natural replacement of traditional OOK, ASK or FSK modulation scheme in favor of a more reliable and energy efficient friendly PPM modulation that guarantee efficiency not only in energy consumption and system's form factor integration, but also facilitating migration from standard battery cell to more efficient, reliable and compact Energy harvesters.



IoT sp.net smart parking

Parking lot management



Disk sensor suitable for street surface installation. The magnetometer reads the magnetic field change which is triggered by a car driving over the sensor. The disk is easy to install. No drilling on the ground needed. The sensor can be used in almost any environmental situation thanks to its extremely small size and to its strong structure. The magnetometer reads the magnetic field change which is triggered by a car driving over the sensor. The 169Mhz technology allows the system to keep track of free/engaged status and to communicate the data within a long distance range. All this results in a limited numbers of gateway needs with a consequent sensible reduction of costs.



Designed in partnership with Spagnolo Srl



Outdoor Cuby Gateway

Cuby collects data from multi-technology sensors and manages them individually at the same time. It can be used both indoors and outdoors. It is a scalable solution and usable in different contexts. It can be powered by a solar panel, both by a battery or directly connected to the power line.



Where can i park? Check it on your smartphone

Cuby uses a Wifi / Bluetooth technology and/or GSM to post to Internet the data collection and make them easily to access. Thanks to the Web server interface it's easy to access to the data. Thus you can manage the sensors of your wireless sensors network from any devices commonly used such as smartphone or tablet.

