Zoltán Kiss - export manager - Endrich Bauelemente Vertriebs GmbH

The E-IOT Mesh with the new cityBox device as a gateway

In the previous issue of the magazine, we have been talking our multi-award winning IoT Eco-System, the E-IoT platform, which actually supports our major offering to our partners described by our last year slogan "We MAKE YOUR DEVICE SMART". Smart features of devices support predictive maintenance, optimize energy consumption, and support remote monitoring. But not only that, we can call this ecosystem to support our everyday healthy life. By introducing a new IoT device, the so called cityBox, which is an air quality detection device, sending the characteristics of the air quality constantly to a Cloud database. Here we have chosen a new slogan, "We take care of the environment" as our goal is to provide local authorities with reliable data of the city air quality automatically with sampling and uploading data in every two minutes in 7/24 operation.

But not only that, cityBox is also able to collect data of surrounding wireless smart sensors such as water level sensors, soil moisture detectors or any other similar devices without the possibility to connect directly to cloud. cityBox collects all their data and sends them over the cellular network (NB-IoT, LTE-M or 2G).

About the device itself...

According to the World Health Organization (WHO), air pollution is the greatest environmental health risk in the European Union (EU). Every year, it causes about 400,000 premature deaths and several 100 billion euros in health-related external costs in the EU. People in urban areas are particularly at risk. Particulate matter, nitrogen oxide and ground-level ozone are the air pollutants that cause most of these early deaths.

To detect the problem can only be done by constant monitoring of the air and the soil quality in order to initiate appropriate protective measures. Therefore, it was our goal to develop a self-powered, 7/24 active and independent measuring and communication station, which, due to its numerous on-board sensors, and flexible wireless extensions could offer solution

on a wide variety of application, locations and measuring area. Its versatility allows effective monitoring amongst others of air quality, water level and soil moisture to early warn of disasters. Versatile sensors allow chemical and physical parameters to be determined with high accuracy as far as they can be measured. This makes the cityBox an all-rounder and serves to protect air, soil and water.

With the help of the most modern electronics, encapsulated in a small housing, these goals can be achieved quickly and efficiently. Thereby the location of the device can be changed in a few minutes. Powerful solar cells combined with sate of the art rechargeable accumulator station ensure the continuous energy supply and is thus energy self-sufficiency. Wiring is thus unnecessary. The required sensors are either accommodated in the device itself or placed in different locations and the data obtained can be fed wirelessly to the sensor device. The measurements can be recorded every second, minute or hour - 24 hours a day - and forwarded to the corresponding Cloud Database for data analysis via modern reliable and cheap Narrow Band / LTE-M communication on the LTE 4G or as a fallback the 2G GSM network.

What cityBOX does, can be described with a few key sentences:

- Detects air quality and the most important chemical and physical measures of it.

- Detects its own operational parameters, thus being able to report expected service black spots, helps for predictive maintenance and supports its own remote surveillance, including GNSS positioning itself.

- Powers itself by reusable green energy, using solar cells and long-life lithium accumulator station.

- Communicates its sensors' data to the related Cloud Database (Endrich Cloud) using narrow band communication.

- Acts as a Gateway for the optional external 868 MHz MESH wireless smart sensor network dedicated to certain tasks. It collects the data of the standalone wireless sensors and forwards their data to the Cloud DataBase on NB 4G network.

So cityBox is a sensor station, a small green power plant serving itself, a communication gateway for connecting himself to the Internet, and also a gateway to the optional wireless MESH network of smart sensor to help them to get their data into the Cloud.

It does these functions all by calling the best available, state of the art and most

modern technologies to help, such as the low power, wide area Narrow Band machine to machine communication , Cloud Database technology, MEMS and electrochemical sensor technologies, state of the art, long life time rechargeable lithium polymer battery technology and the MESH wireless local networking, that works on sub-Gigahertz frequency providing best penetration in harsh environments.

Expectations that cityBox fulfills:

- On board sensors for most important chemical and physical air quality measures such as CO2, NOx, Ozone, Particulate Matters concentration, temperature, humidity, light conditions, noise and vibration conditions

- 7/24 independent operation (no external power source or maintenance required), once installed it will work independently

- Connection on sub-gigahertz frequency with oprional local wireless sensor network, such as soil moisture sensors, presence and motion detectors, counters etc. Gateway between local MESH and LPWA networks.

- Using cheap prepaid GSM communication : NB-IOT 10 EUR for 10 years and 500 MB of data.