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## Wireless sensor technology helps prevent floods and forest fires

Manufacturer of hardware for implementing wireless sensor networks, Libelium, has joined forces with Digi International to develop a low power wireless sensor capture, geo-localisation and communication device with high transmission power, which can help in the prevention of environmental disasters

Sensor technology such as this is important for monitoring the environment around us, and can help in the prevention of forest fires and floods to detecting and monitoring contamination levels in the city.

Libelium's association with Digi International, a specialist in device networking for business, began when Libelium needed radio frequency modules to guarantee accurate transmission of information from sensors in isolated or difficult-to-access areas.

To enable Libelium to develop its sensor devices, they needed to source a wireless networking provider that offered both long-range links and the interconnection of wireless networks of different frequencies.

When Libelium started developing the Wasp mote device, it - concluded Digi International provided the best, most comprehensive solution.

Based on a modular architecture, Wasp mote is able to detect a variety of parameters such as humidity, temperature, CO2 emissions, heartbeats and vibrations. It can be used in numerous industries including agriculture, environmental, logistics and security.

Libelium's CTO, David Gascón, says: "Our objective is to detect and store critical values, and send these values to a data processing centre for analysis or send emergency alarms. In the agricultural industry, Wasp mote sends a message through the ZigBee network when the sensors detect the optimal level is reached in soil humidity. This contributes greatly towards efficient water management. It is therefore vital for us to deploy modules built to operate reliably under a range of conditions."

Wasp mote is a developers' oriented platform. For this reason all the programming libraries have been released as open source, so researchers can control any parameter.

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## **Easy interconnection**

The Digi modules satisfy the unique needs of Libelium, providing low-cost and low-power wireless sensor networks. Designed to operate in harsh environments, the modules allow Libelium to network-enable sensor devices so that they can be monitored and controlled remotely. Libelium currently deploys seven of the eight modules in Digi's product range, among them: XBee and XBee PRO 802.15.4 and DigiMesh; XBee ZB Pro feature set; XBee XSC (900MHz) and XBee 868. These modules are optimised for use globally for lower and upper frequency bands.

"The Digi modules operate from 868 to 900MHz and 2.40GHz," says Gascón. "This is an invaluable advantage to us, as it means we can choose the model we need and to reach international markets with just one plug. Likewise, we can change protocol (802.15.4 or ZigBee) and transmission power (1mW or 100mW)."

Waspote achieves long-range links of 7km - 2.4GHz, 24km - 900MHz and 40km - 868MHz, making it possible to monitor virtually any installation.

"The long-range links are fundamental when monitoring delicate natural environments," explains Gascón. "Infrared or ultraviolet sensors are used to detect flames, heat and gases that help identify the molecules of chemical compounds (CO and CO<sub>2</sub>) generated during combustion. A Waspote sensor device can help to detect and prevent forest fires." Gascón continues, "Another example application is in the logistics field. Thanks to the Digi technology, shipping container conditions such as irregular temperatures and humidity levels, and whether the products have been contaminated or suffered an impact during transportation can be detected by Waspote. Our technology allows this information to be transmitted wirelessly."

## **Wireless excellence**

Waspote is ready for the worldwide market having successfully obtained the FCC (USA), CE (Europe) and IC (Canada) certifications. The certification process – key to ensuring global compatibility and correct use of the radio frequency spectrum – ran quite smoothly thanks to the collaboration between Libelium and Digi. Digi simplified the whole process by ensuring all certification test reports, schematics block diagrams and other proprietary information on the XBee products were made freely available to the certification organisations.

Gascón is pleased with the partnership. "Digi has an outstanding reputation for reliable products and they have met all of our project requirements for Waspote. We will certainly continue to use Digi products for future developments at Libelium," he concludes.