Liverpool John Moores University uses Libelium technology to monitor real-time air quality and weather throughout the Liverpool City Region as part of an ERDF- funded research project.

For more: www.manxtechgroup.com/iot

CASE STUDY

Internet of Things (IoT) Air Quality and Weather Monitoring

Company Name
Liverpool John Moores University (LJMU)

Location
Liverpool City Region

Type of Business
Local authorities and Academia Reserch

Services
Libelium IoT

Liverpool John Moores University
LJMU and the Liverpool Logistics Offshore and Marine Research Institute (LOOM), embarked on an EU project where the goal was to monitor air quality, weather, and traffic volumes in different regions of the Liverpool City Region.

For more:
https://www.ljmu.ac.uk/projects/lcr-sustainable-green-travel-corridors

Air Quality and weather monitoring with IoT

"These technologies will provide the local authorities with up-to-date live information from all the sensors across the city on a single interface. These live and historical data for monitoring areas will enable strategic investment decisions to make an impact on the Liverpool City Region."

Prof. Trung Thanh Nguyen
co-director of the LOOM institute at LJMU.

The LCR Sustainable Green Travel Corridors Project (also called LCR SUD) is a £16.7m project until 2021 and part of a Liverpool City Region-wide initiative to encourage more cycling and walking.

LJMU is leading strand 2 - digital innovation. Working across the whole of the Liverpool City Region (LCR), LJMU's aim is to promote and incentivise sustainable/active travel and infrastructure through intelligent digital technologies such as IoT sensors, big data analytics, and mobile apps.

Project Background

As part of the LCR SUD project, LJMU would be measuring particulates, NO2, O3 and other gases that are used to formulate AQI (air quality index) readings. Following a procurement process, LJMU selected to work with Manx Technology Group who would supply Libelium Plug & Sense IoT sensors.

With support for battery, solar and 4G technologies – the Plug & Sense units were well suited for urban deployment and autonomous operation. The sensors would transmit data back for use by LJMU in their dashboards, analytics, and mobile app.

01 **Air quality measurements**
Researchers needed to understand air quality and pollution levels, to use alongside other measurements relating to weather and traffic levels.

02 **4G and Solar Support**
Sensors would be installed at key locations across the city region and would need to run on battery + solar, and use the existing 4G mobile networks.

RESULTS

85% IOT NODE BATTERY CAPACITY AFTER 1 YEAR OF USE

Increased humidity sees a consistent decrease in cycling numbers ⬆

Increased temperature sees a consistent increase in cycling numbers ⬆

Air quality is highly correlated with both wind speed and direction ⬆

Product Features

Libelium Plug & Sense Smart Cities supports the mesaurement of several environmental parameters including Particulates (PM1, PM2.5, PM10), NO2, CO, CO2, SO2, O3 and Noise Levels.

The units support 4G, LoRaWAN, Sigfox, Zigbee and WiFi technologies, with options for battery, solar and mains power.

Solution

Manx Technology Group (MTG) supplied LJMU with Libelium Plug & Sense, Smart Cities Pro sensor nodes with environmental monitoring sensors. The MTG technical team also offered advice and configuration assistance while the LJMU developed the software to integrate with their technology stack.

The Plug & Sense nodes are be used to measure environmental parameters such as particulate and gases (NO2, CO2, CO, SO3, O3). The data would be used by the research team alongside other data sources such as weather, pedestrian, cycle, and traffic counts.

4G wireless, battery and solar panels allowed the units to operate entirely autonomously.

libelium

01 **Support for 4G wireless communications**
Supporting a wide range of RF technologies such as 4G, NB-IoT, LoRaWAN and Sigfox, the P&S with the 4G modules were well suited to the deployment in the Liverpool City Region.

02 **Solar power and battery**
The Plug & Sense units can run without the requirement for a mains supply; using energy from solar panels and battery for their autonomous operation.

03 **Inexpensive environmental monitoring**
Supporting a range of gases and particulate measurements, P&S is a flexible alternative to fixed monitoring stations where an indication of air quality is required.

Future

The LJMU team are working with the Combined Authority and Local Authorities to evaluate the data from the project and plan for the next steps in monitoring emissions across the region.

"These technologies will provide the local authorities with up-to-date live information from all the sensors across the city on a single interface."

PROF. TRUNG THANH NGUYEN
Co-director of the LOOM institute at LJMU

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