



**Success story**

# Acuario de Zaragoza



**Monitoring diverse environmental  
conditions of the largest fluvial  
Aquarium in Europe**

# Intro

## Monitoring diverse environmental conditions of the largest fluvial Aquarium in Europe

Libelium has been collaborating with the Aquarium of Zaragoza for almost 10 years, using this space as a testbed where the solutions can be tested, improved and calibrated.

For this reason, the Aquarium was the chosen place to test One. The various ecosystems recreated in the Aquarium were the best testbed option.

They needed to measure and monitor the parameters of the tanks and Libelium needed to test One in the most varied conditions possible



# The challenge

## DIFFERENT ENVIRONMENTS TO MEASURE

To monitor the diverse environmental conditions of the largest fluvial Aquarium in Europe guaranteeing that all the species would feel at home.

Acuario  
de Zaragoza



### PROJECT DETAILS

**Client**  
Acuario de Zaragoza

**Location**  
Zaragoza, Spain

**Sector**  
Tourism, Nature

# The solution

## ONE SOLUTION FOR WATER AND AGRICULTURE MONITORING

Several easy to set up and flexible One nodes, in order to measure environmental parameters, water quality, ground conditions to maximize the quality of life of the different animals of the Aquarium.

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### SOLUTION DETAILS

**Vertical**  
Sustainability

**Solution**  
Libelium One, Libelium Cloud

**Parameters**  
Water, Soil

**Connectivity**  
4G

# Behind the change

The Aquarium of Zaragoza is the most important fluvial aquarium in Europe, it integrates different river ecosystems of the world. There are more than 5000 animals of more than 350 species from the 5 rivers represented:



**Monitoring 5 ecosystems**



**350 species of mammals, reptiles and fish**



## The Nile River in Africa

The longest river on our planet



6,695 km long



30% of its course is through arid lands.



137 species of amphibians



129 species of fish



## The Mekong River

The largest river in Southeast Asia and the tenth largest in the world by volume.



4,600 km long



second most fish diverse river (an estimated 1200-1700 species, 62 of which are endemic to this river)



among the 10 most endangered rivers in the world



## The Amazonas in America

The second longest and most abundant river in the world and the most biodiverse place on the planet.



6,400 km long



2,000 species of mammals and birds



More than 10,000 species of plants.



3000 species of fish



## Darling Murray in Australia

Is the most important river system in Australia



Murray is 2,500 km long and the Darling is 2,739 km long



The last 500 km of the river system are very arid



Used for agriculture and to supply the population



Low rainfall and high evaporation



## Spanish river Ebro

The Ebro River Delta is a natural area of great biological wealth and the most important aquatic habitat in the western Mediterranean



6,400 km long



Second most important river in Spain



Deteriorated water due to pollution

In each one of these places the environmental conditions are very different from one another, hence the Aquarium labor was to replicate the different ecosystems in the different tanks where the distinct species inhabit. Thus, the device needed to measure the different parameters should be ready for the various weather/environmental conditions of each place.

A success story for Sustainability

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# Beyond the challenge

## Libelium One



Among the exotic species that coexist in the Aquarium of Zaragoza are fish and amphibians, but also reptiles, such as the Nile crocodile or the Amazon anaconda, and mammals, such as the otters of the Ebro River or the Amazon marmosets.

With this variety of ecosystems, measuring environmental parameters becomes more complicated. The aquarium needs to measure aspects of water quality such as pH, conductivity or ORP, environmental parameters such as luminosity, temperature and humidity, and soil parameters to preserve the vegetation of each of the rivers in the Aquarium.

Libelium One allows any sensor to be easily integrated, regardless of the protocol used.

We needed a solution that was easy to configure and that would allow us to monitor



different aspects such as the pH level of the water, "the ambient temperature or the humidity of the soil," says Javier González, director of the Aquarium.

One is a plug and play device that requires no programming. This is something of great value to the Aquarium as the employees are biologists and not technologists. One automatically detects the probe regardless of the socket in which it is placed and sends the data to the cloud via 4G. Then, you can visualize the gathered data, receive notifications, alerts and manage all your devices remotely.

Furthermore, it could not be a device that fights climate change if the design itself was not sustainable. With One, Libelium has put eco-design at the core of everything, achieving a device that meets the 5 Rs.

### R<sub>educe</sub>: R<sub>euse</sub>: R<sub>epair</sub>: R<sub>ecycle</sub>:

consumption, carbon footprint and size.  
same sensors for multiple projects  
(capable) and **Refurbish** (capable)  
eco-efficient polycarbonate manufacture

If we have been able to replicate the conditions of each of the ecosystems in this aquarium, imagine what we can do to overcome any environmental challenge.



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