Hydro-S3DP

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The Hydro-S3DP water management optimizes costs, improves production systems, and implements its own research innovation.

Overview

Hydro-S3DP is a secured IoT solution that allows in situ detection of Legionella proliferation and direct disinfection actuators for bacterial treatment in air conditioning systems.

It combines state-of-the-art sensors including in-house sensors, Big Data analysis through Machine Learning Algorithms and state-of-the-art water disinfection systems to enable Fast sensing and activation of system against Legionella contamination in cooling systems in Hospitals and Hotels.

In addition, Hydro-S3DP will allow reducing by 30-60% the biocide consumption and by up to 88% the energy required for the cooling tower system circulation with hard water condition (saving reaching up to 70 000€/year), therefore reducing by up to 30% the cooling tower maintenance cost, as well as increasing their life span from 5-8 to 25 years.

Additionally, Legionella & other bacteria preventions may cost around 44k€ and 1M€ in hotel and hospital respectively without taking in consideration outbreak still be occurring, enhancing a large cost of 1.2M€ up to 245M€ in the case of the Illinois Veterans Home in Quincy (IVHQ) that has been destructed and has been planned to be rebuilt as final remedy to fight against legionella outbreak as announced in 2018. More than an economical solution for cooling systems, Sens Solutions offers a global solution to prevent any Legionella outbreak.

Water Sensors

It is a set of physical and electrochemical sensors for biofilm, chlorine, temperature, pH, conductivity including innovative state-of-the-art sensors

- **Legionella's sensor**: It is an optical sensor that has been developed for the detection and quantification of Legionella. A new electrochemical sensor is being developed for detection that will allow for the same results at a significantly lower price per sensor. This new electrochemical sensor is the result of the improvement of a previous sensor, to which the analysis procedure is modified to allow the detection of Legionella. DNA detection. **LOD 1.5 x 10^3 CFU**.

- **Biofilm Sensor**. It is an optical sensor that detects and quantify bacterias in water (No identify what kind of bacterias there are). The monitoring is online and in real time.

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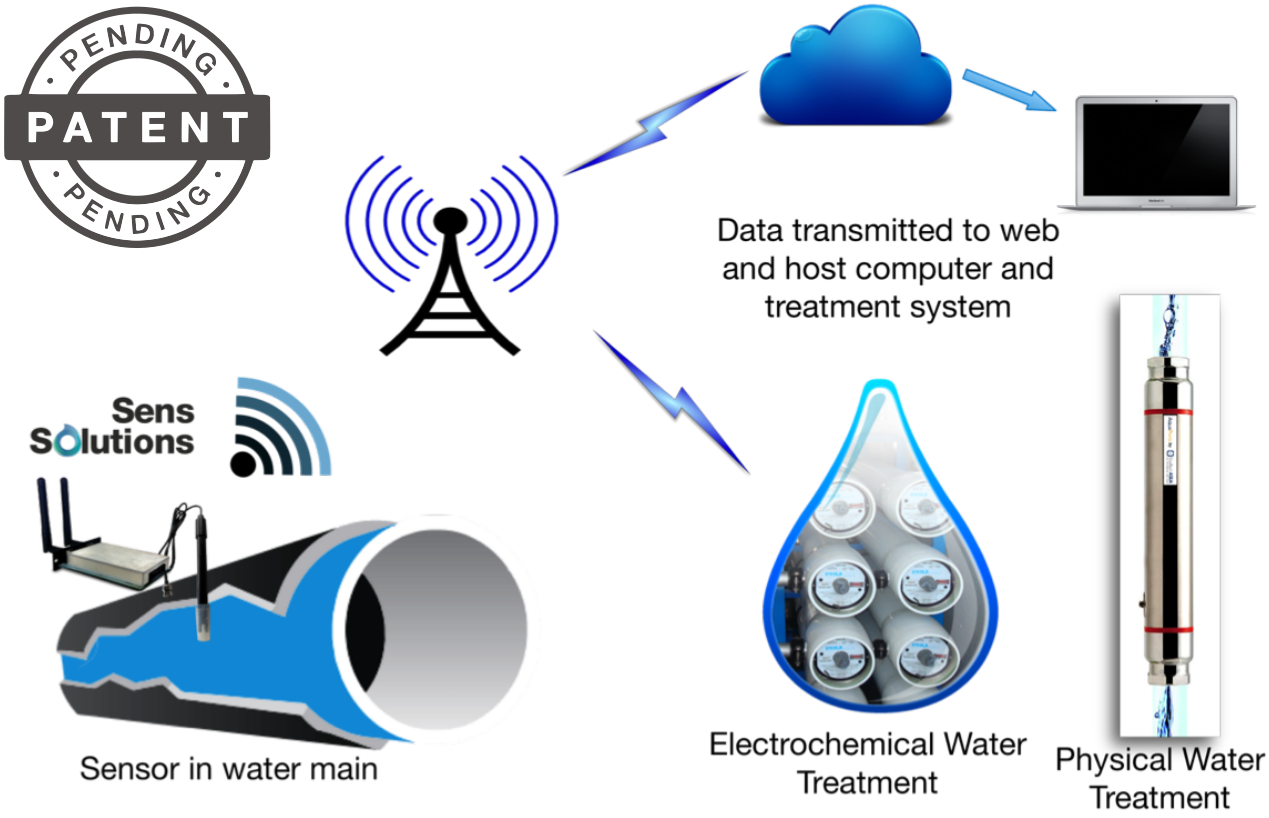

Actuators (Water Treatment)

The treatment base of Hydro-S3DP is a non-harmful derivative of chlorine, as an alternative to the use of high temperatures and hyperchlorations.

To optimize the water treatment Hydro-S3DP solution includes the use of two complementary systems, this being an important innovation in water treatment: 1) an infrared and electron generator device (**WATER SOFTENER**) and 2) an electrochemical water activation system (**ECAS**).

The water treatment will receive the instructions from the sensor or from the servers to activate the treatment in the proper measure.

Sens Solutions' Remote Monitoring System

Internet distributed computing system that receives the data, interprets and acts.
It is a monitoring service secure, flexible and modular, which allows you to collect data from any system (computer, sensors analog systems, etc) and send them to Sens Solutions servers.
Once it receives the data, analyze and deal in real time and it can trigger multiple actions: for example if they exceed thresholds to trigger alarms mobile (push), apply analyzes and store the database for a subsequent treatment.
Users has access a control panel (dashboard), fully configurable, which defines what data you want to see and how you want to see.
It has different systems to communicate alarms: email, push notifications, SMS and voice calls.

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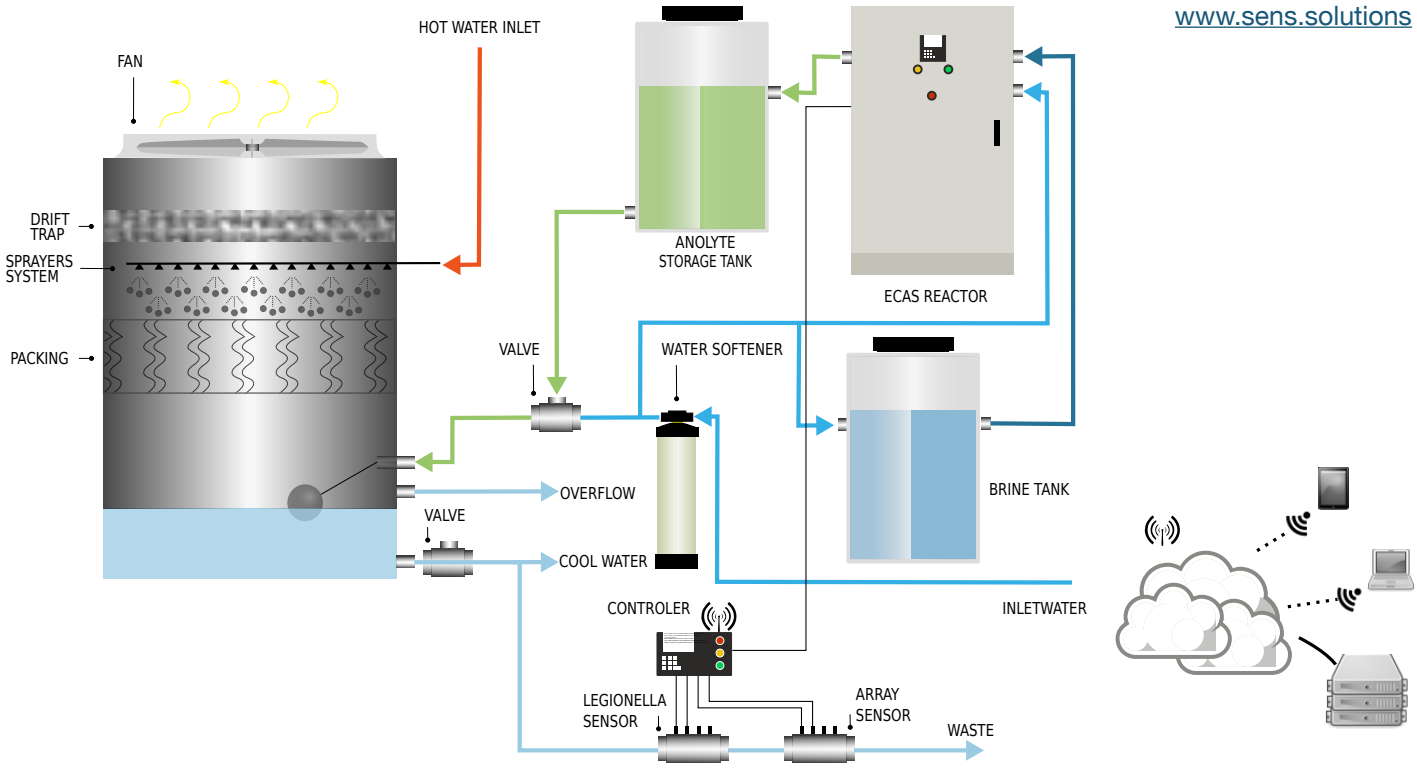

In the next phase, it will have a machine learning system that will be able to learn from the historical data and make forecasts.

Sens Platform Solutions (PSENS)

It's an integrated data capture platform. Its main characteristics are:

✓ Universal connectivity: you can connect virtually any device, from a computer system to an analog sensor "one-wire" or dry contacts.

✓ Flexibility: each node is autonomous, but can be backup to another node or gateway for a set of nodes physically close in order to optimize and communication.

✓ Low consumption. The consumption depends on the connected devices, but with few sensors, the system consumes up to 15W.

✓ Energy independence: The low power needed allows us to offer alternative power systems, from photovoltaic systems to picoturbines (very interesting, because in technical rooms does not usually shines the sun).

✓ Redundant communications: standard communications systems are Ethernet, WiFi and 3G / 4G, but we can also use satellite links and Packet Radio.

✓ Fault tolerant: PSens is designed to accept communications problems o power outages. Never looses data.

✓ Security: All data transfers are encrypted (TLS 3). The system is designed to avoid intrusion and rogue manipulations. Remote access is always over encrypted tunnels.

✓ Collaborative System. Respecting property and sensitivity of the data collected, the system is able to use remote data (other PSens units or data from Internet) to take decisions.