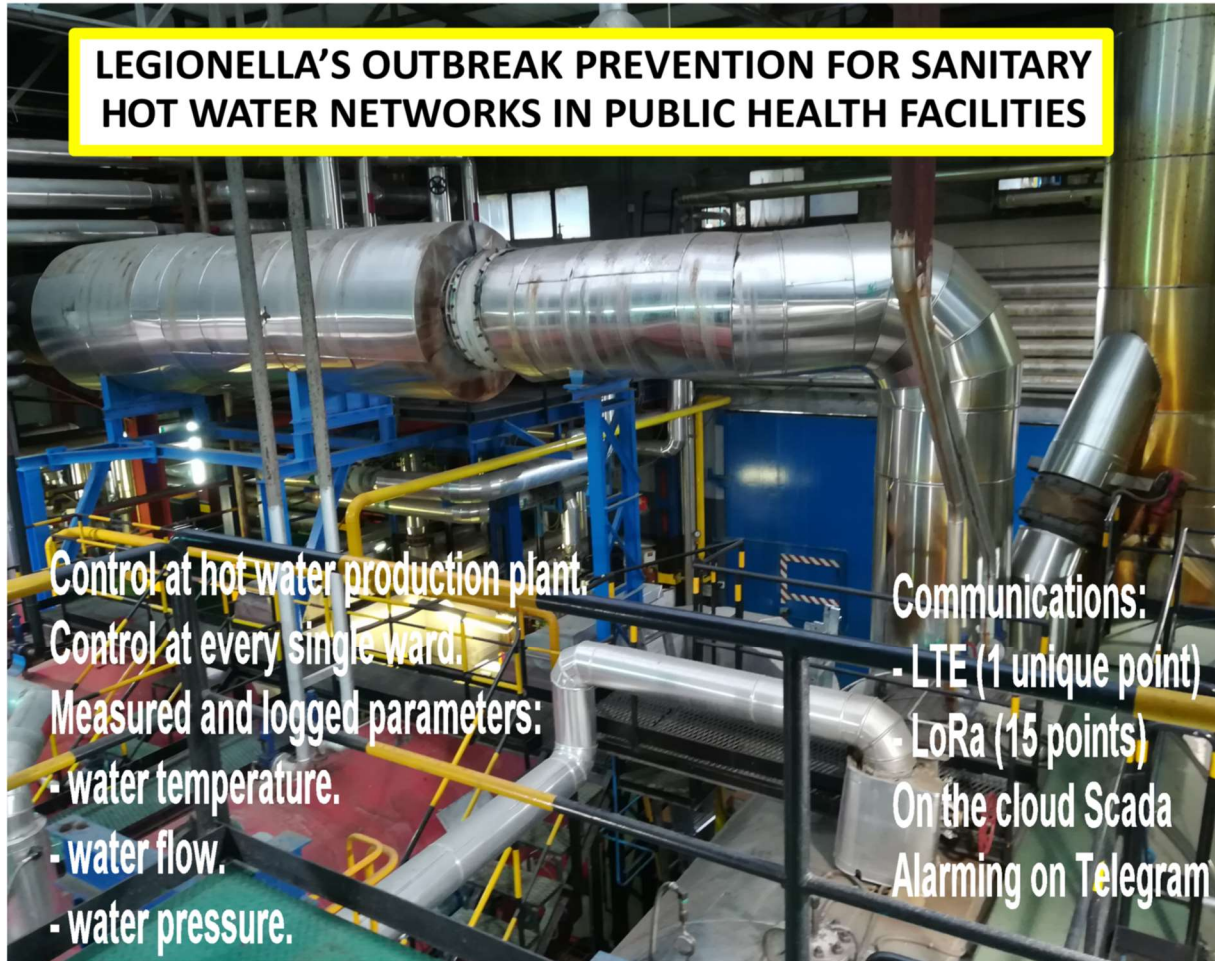


LEGIONELLA'S OUTBREAK PREVENTION FOR SANITARY HOT WATER NETWORKS IN PUBLIC HEALTH FACILITIES



Control at hot water production plant.
Control at every single ward.
Measured and logged parameters:

- water temperature.
- water flow.
- water pressure.

Communications:

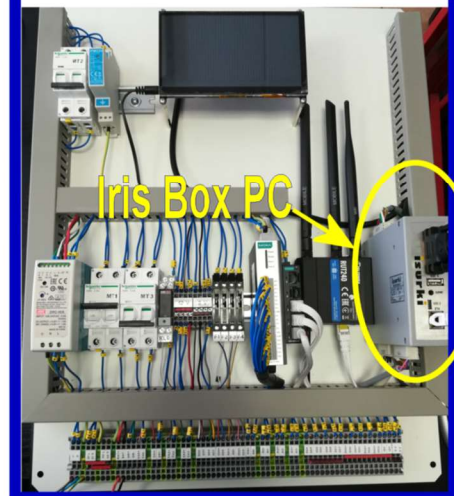
- LTE (1 unique point)
- LoRa (15 points)

On the cloud Scada
Alarming on Telegram

MATERNO-INFANTIL & AMARA HOSPITALS IN SAN SEBASTIAN (SPAIN)



TORADEX's T30 based IRIS BOX PC outstation



Iris Box PC

APPLICATION NOTE #9		
Sector	Related products	Customer
 	<p>IRIS BOX PC</p> <p>ISURLOG LoRa</p>	<p>Osakidetza (public health service of the Basque Country, Spain)</p>

Legionella prevention system

ISURKI, an instrumentation & control company located at the north of Spain, has developed and deployed during the past two years, in a tight collaboration with the dept. of Maintenance of the Donostia Hospital (a facility part of the Basque public health system), an **IRIS & ISURLOG Ecosystem** based turn-key control system for the prevention of Legionella's outbreaks within the hot water distribution networks of the Materno-Infantil and Amara Hospitals, two of the main buildings of the Hospital Universitario Donostia at the city of San Sebastian. The whole system consists of:




- 1 unit of **IRIS BOX PC** outstation with LTE communications at the hot water production plant.
- 15 units of **ISURLOG** LoRa outstations with LoRa communications deployed all over the 15 pavilions spread throughout the two hospitals.
- 1 unique LoRa gateway providing wireless connectivity to the whole environment.
- On the cloud SCADA utility for real-time monitoring, data logging and alarm management.

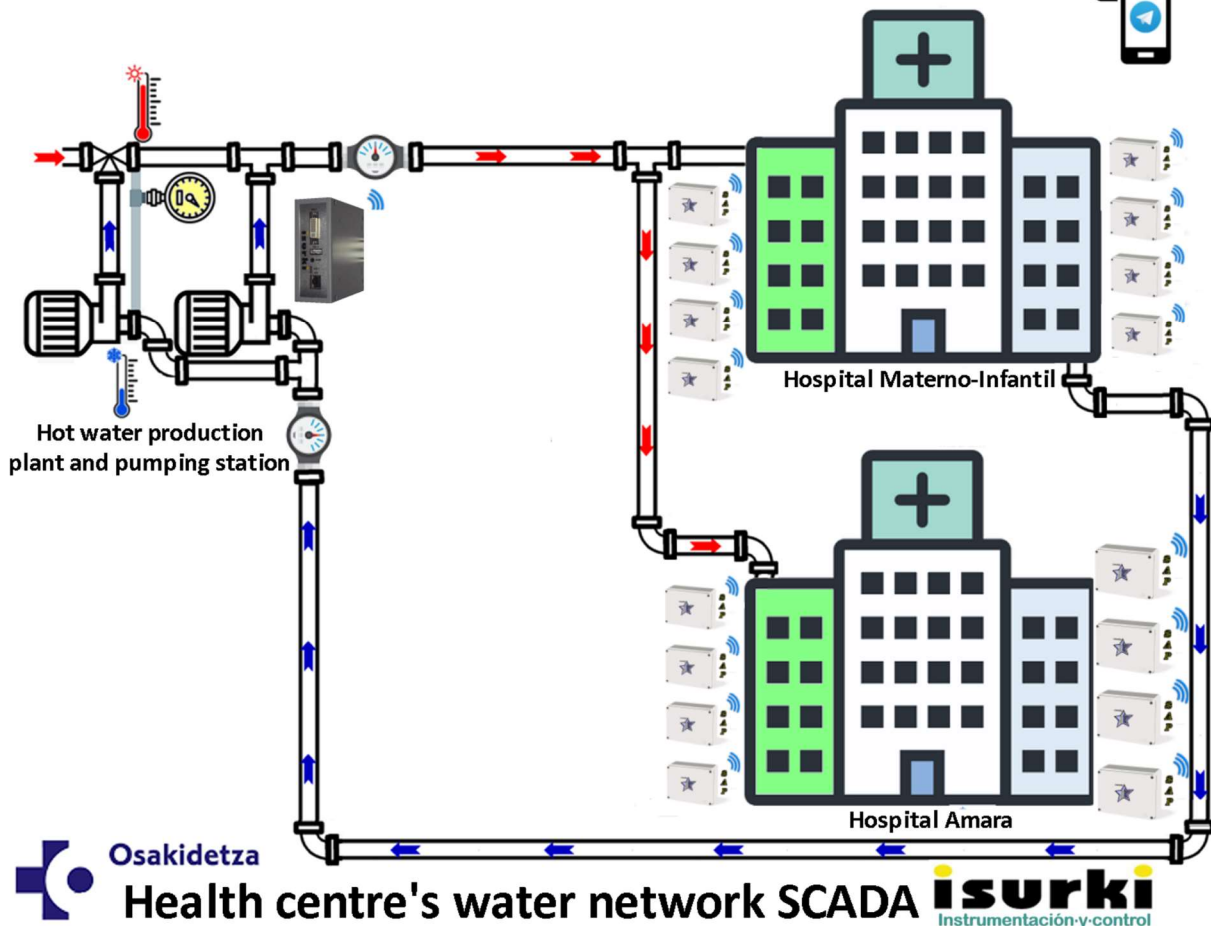
The main goal of the project is to automatically detect the undesirable conditions that can trigger the spread of the Legionella bacteria within the hot water distribution network of the hospital, warning the authorized users when this scenario is likely to occur and allowing the staff in charge to correct the origin of the issue before a real risk can be present at the consumption points.

Moreover, the system has implemented an adaptative control of the new digitally controlled pumping station and chlorination panel which, in both cases, match their functioning to the current needs of the network, thus **saving both energy and disinfection product**.

The **logged data** of the different parameters are **uploaded to the cloud** (Google Drive) every 15 minutes, allowing the user to download them in a spreadsheet format within a user-friendly environment.

The following diagram shows the system architecture, which is forecasted to be extended with a third building this year.

	LoRaWAN gateway
	IRIS BOX PC at production plant and pumping station with LTE comms
	ISURLOG units in every ward with LoRa comms measuring hot water flow & temperature



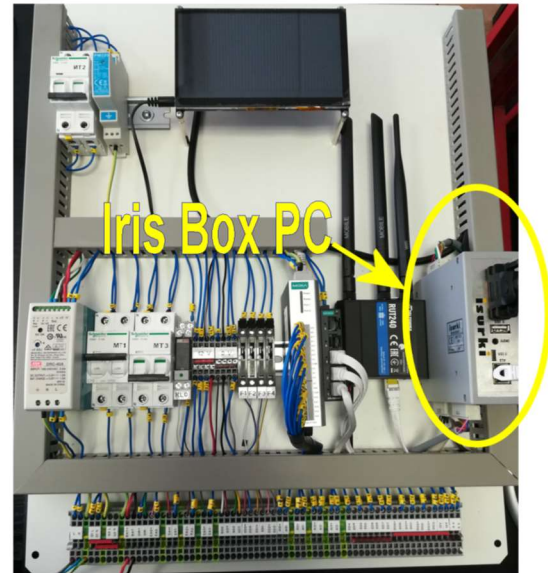
The solution provides:

- **Real-time alarming** if conditions that facilitate the spread of the Legionella bacteria are likely to appear, **reducing the operational response time and assuring healthy conditions.**
- **On the cloud data logging** allows the analysis of the evolution of suspicious or risky events.
- Optimized control of the in-line pumping station, automatically adapting its operation to the current users' demand, thus **saving energy costs and reducing the emission of GHGs.**
- **Digital link with other relevant systems** such as the water chlorination analyser and dosing system and the above mentioned in-line pumping station.

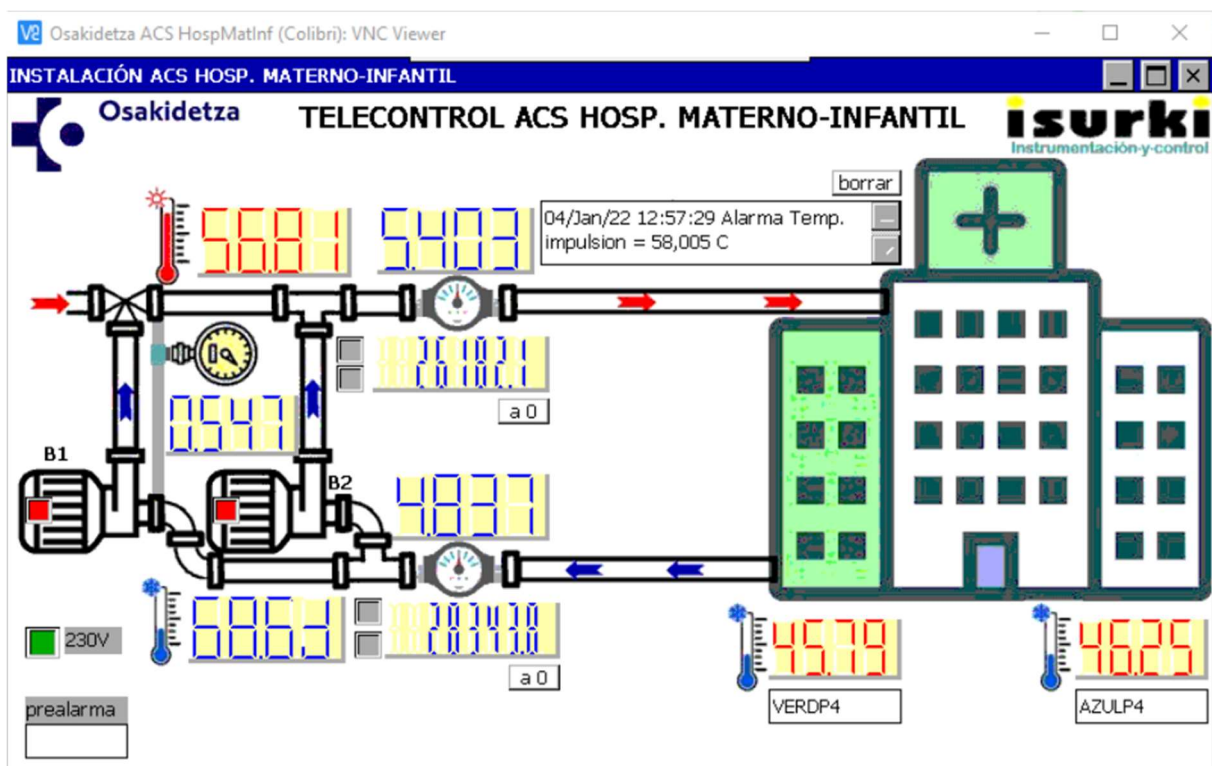
Hot water production plant

Sanitary hot water is produced using cogeneration technology, assuring the correct temperatures to provide the best conditions to stop the spread of colonies of the Legionella bacteria. At this site, an **IRIS BOX PC** outstation (see right) with LTE communications controls all the significant parameters to achieve the desired scenario as well as warning the user of any process variable out of the expected working range:

- Outlet water (pumped to consumers): temperature, flow, volume, pressure.
- Inlet water (return from facilities): temperature, flow, volume, pressure.



IRIS BOX PC based telecontrol outstation at the hot water production plant and pumping station



Pumping station diagram at the user accessible dashboard with real-time readings.

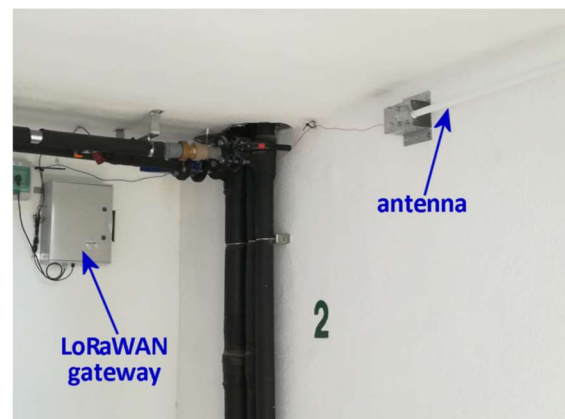
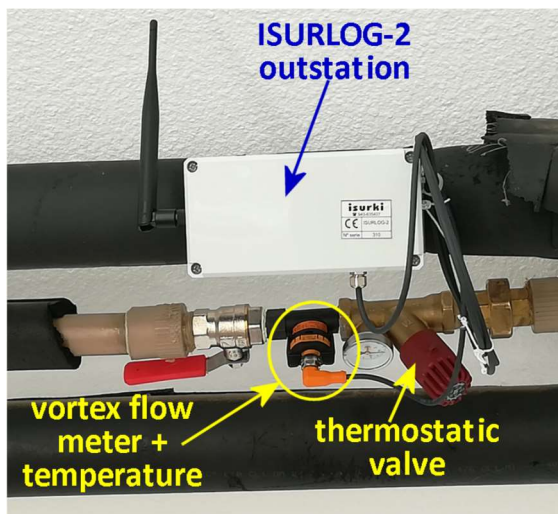
Distributed LoRa outstations

The **ISURLOG-LR** LoRa-based outstations are deployed over the next facilities:

- Materno-Infantil Hospital:
 - 12 hospitalization wards.
 - the surgery ward.
 - the paediatrics ward.
- Amara Hospital:
 - 4 hospitalization wards.
- Aranzazu Hospital:
 - 16 hospitalization wards.
- Technical facilities:
 - The laundry ward.

In total, they involve 34 **ISURLOG-LR** LoRa-based outstations controlling the next sensors: 23 flow meters, 23 water temperatures, 7 water pressure, 3 reservoir levels and 1 free chlorine measurement.

Since they are battery powered units, no electrical installation is required. New models include the **energy harvesting** option, thus providing **unlimited battery life** and avoiding the operation of its replacement. The **ISURLOG** unit manages not only the required supply to the sensors but the LoRa communication power states and performances, thus optimizing the internal battery consumption.



↑ LoRaWAN gateway at the 2nd floor providing wireless connectivity to the whole system.
 ⇐ ISURLOG-2 outstation measuring temperature & flow at the hot water outlet of a ward.

Customer's opinion	
	<p><i>"The implementation of the hot water network control system based on the ISURKI's IRIS & ISURLOG ECOSYSTEM solution has enabled us to effectively detect any undesirable scenario that could favour the proliferation of Legionella in our network and to optimise the management of the technical installations concerned".</i></p> <p>Daniel López Ortiz. Engineer at the Projects and Infrastructures Dept. OSAKIDETZA – OSI DONOSTIALDEA</p>

SCADA utility

The system provides an internet accessible and secure user panel, providing:

- General information of the system:
 - Connection to internet status.
 - Web server status.
 - LoRaWAN gateway status.
- General view of every single building
 - All the temperatures of the pavilions' circuits at a glance.
 - All the thermostatic valves' status (O/C) at a glance.
- Detailed information on each pavilion/facility:
 - Intuitive real-time gauges:
 - Water temperature at the end of the circuit.
 - Water flow in circuit.
 - Water pressure (only on the upper floors).
 - Battery capacity.
 - Trending graphs (traces selectable one by one):
 - Water temperature at the end of the circuit.
 - Water flow in circuit.
 - Water pressure (only on the upper floors).

