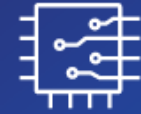




Expertise



Advanced
Technology



Competencies



Funding

Digital Challenge Info Pack



Innovative
Solutions

Online conductivity sensors for predictive
operation of water treatment plants

ACCIONA Agua



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About the Digital Challenge Owner - Acciona Agua

- The [Water business of ACCIONA](#) is a worldwide leader in the water treatment sector. It has strong capabilities in the design, construction, commissioning and operation of a large variety of water treatment plants, including seawater desalination facilities, using reverse osmosis (RO) technology.
- The total population that benefits from ACCIONA Agua's services is about 90 million people in 30 countries of 5 continents. ACCIONA is one of the market leaders in the RO desalination arena with a treatment capacity of almost 5 million m³/d.

Digital Challenge Context

- Lack of knowledge by water operator about what is happening inside a pressure vessel containing several reverse osmosis (RO) membranes.
- Need to stop part of water production once problems in a rack (a series of pressure vessels joint in one unit) are identified by conventional conductivity/flow measurements in the permeate water. Preventive programmed maintenance activities are carried out to minimize problems.
- The solution will provide early-warning signals of malfunctioning, identifying the reverse osmosis (RO) element(s) that cause(s), allowing predictive maintenance and improving operation.

Digital Challenge Description



- **Mechanical features:** The size of the sensor must allow it to fit inside the permeate tubes (28.6 mm of diameter, polymer based), unless another alternative to measure conductivity can be found.
- **Environment requirements:** Permeate water is highly corrosive because almost all ions are removed by the reverse osmosis (RO) process. Any equipment to be in contact with permeate water should be designed and manufactured to deal with such conditions and to have a lifespan of at least 2 years. (Such environmental requirements suggests that metal components should not be in contact with the permeate water).

Other Technical Information

- **Pressure vessel material:** reinforced fiberglass.
- **Permeate tube material:** commercial plastic (ABS, PPE, PVC, PPO, PSU,...).
- **Inteconnector material:** Noryl or ABS.
- **Measurement frequency:** 1 measurement per hour (at least 1 measurement per day).
- **Conductivity measurement range:** 50 - 4000 μ S/cm
- **Sensor-receiver communication:** The sensor needs to wirelessly communicate with the receiver. The receivers may be placed outside the pressure vessel, in front of each sensor.

Digital Challenge Success Criteria

- Wireless sensor solution
- Signal quality (high signal-to-noise ratio, reproducibility, repeatability)
- Cost of the solution
- Wireless rechargeable long durability batteries (minimum of 2 years)
- Ease of wider implementation of the solution across locations
- Scalability of the solution
- Time-to-market

Digital Challenge Owner Support

- Technical support for the sensor development: definition of requirements, project management.
- Access to validation facilities (ACCIONA R&D Center in Spain) where the results can be compared to those obtained following traditional procedures.
- Mentoring and follow-up
- If the pilot is successful, opportunity to implement the technology in other plants operated by the company.
- ACCIONA Agua will take care of any safety training that should be carried out prior to testing the devices.

Other Relevant Info

- <https://www.youtube.com/watch?v=VGygbPKSZs4>