

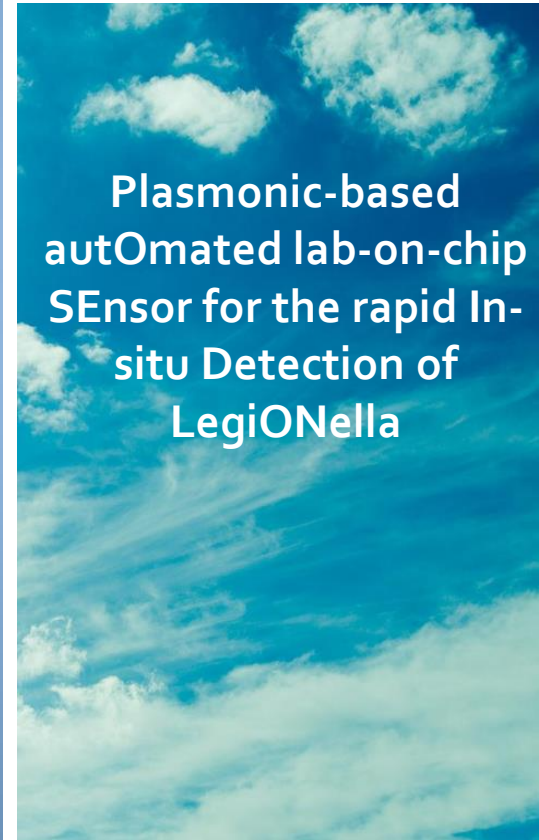
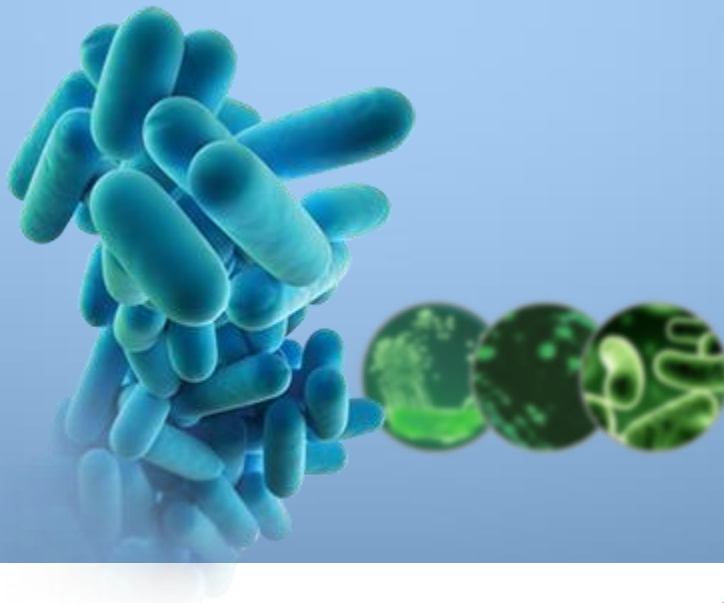


HORIZON 2020



PHOTONICS AGAINST LEGIONELLA

A new generation sensor to face a significant Health and Safety Societal challenge



Plasmonic-based
autOMated lab-on-chip
SEnsor for the rapid In-
situ Detection of
LegiONella

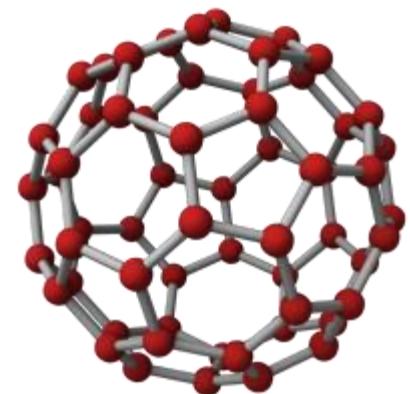


THE PROJECT



Poseidon

The **POSEIDON** project adopts a multidisciplinary approach involving key enabling technologies (KET) in photonics, aiming at the exploitation of the surface plasmon resonance (SPR) phenomenon to develop a fully automated platform for fast optical detection of *L. Pneumophila* pathogens. This detection platform will be implemented as a prototype in which water and air samples are sequentially concentrated, injected into a microfluidic system, and delivered to the SPR sensor for analysis. **The system will be designed to allow for its future integration in water distribution and HVAC (heating, ventilation and air conditioning) for prevention of *L. Pneumophila* outbreaks.**



OBJECTIVES



Poseidon Project

The objective of the POSEIDON project is to develop a **SPR-based biosensing platform** for the **detection** of *L. pneumophila* bacteria, with **high sensitivity and high specificity**, translating the results obtained as experimental proof of concept into an operating automated **prototype usable in industrially relevant settings and by untrained personnel**.



CHALLENGES



Poseidon Project

- **High sensitivity** and **low detection limit**
- **Selectivity** towards target pathogen detection in order to avoid both false-positive and false-negative results
- **Short analysis times**
- **Ease of use**, possibility of on-site monitoring and automation of the sample manipulation and detection procedure.
- **Efficient delivery** of the bacteria: cells should remain intact throughout the whole fluid transportation system in the device, and should not adhere to the fluidic piping and microfluidic channels, so that virtually all of the bacteria cells in the sample are delivered to the sensing unit.
- The **size** of the device should allow samples to be analyzed at the point of need rather than in a separate laboratory, allowing **reduction of cost** per single measurement and increase in throughput.

INNOVATION



Poseidon Project

SPR sensors provide an extremely sensitive and versatile tool for miniaturized label-free sensing platforms integrated into lab-on-chip systems for potential applications in environmental monitoring, biotechnology, medical diagnostics, drug screening, food safety and security.

An **innovative sensing device** architecture will be used to create a platform to yield reliable measurement readouts of legionella bacterial cells that would be driven and entrapped on a custom sensing surface specifically designed with opportune positive and negative controls.

The detection platform will be implemented as a **prototype** in which water and air samples are sequentially concentrated, injected into a **microfluidic system**, and delivered to the SPR sensor for analysis. The system will be designed to allow for its future integration in water distribution and **HVAC** (heating, ventilation and air conditioning) for prevention of L. pneumophila outbreaks.

PARTNERS



Poseidon Project



PROTOLAB

Italy



Clivet

Italy



Catlab

Spain



Metrohm Applikon

Netherlands



Uppsala University

Sweden



A.R.C

Italy

PROJECT DETAILS



Poseidon Project

Project reference

644669

Start/End

Gen 2015-Dic 2017

Total cost

EUR 4.068.781

EU contribution

EUR 4.068.781

Programme acronym

H2020-ICT-2014-1

Subprogramme area

ICT-26-2014 Photonics KET

Contract type:

Research and Innovation Actions



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