

# Fact sheet no 1: Development of a Portable Automated Water Analyser for Viruses

## Introduction

Water-borne viral diseases pose high risks for public health worldwide. The urban wastewater contains large number of pathogen viruses, and even the most advanced wastewater treatment is not safe for full removal of virus particles.

The conventional biological water quality indicators do not provide adequate information about the presence of pathogenic viruses. The currently available reliable virus test - based on molecular biology - is expensive, time consuming and labor intensive, thus limited to few laboratories with sophisticated facilities and well-trained personnel, even though the protection of water networks against pathogenic viruses is crucial.

## Objective

In the AquaVir project we aimed to develop a novel, cost effective, portable, on-site detection system, which is capable for monitoring human enteric viruses in different freshwater bodies.

The method is based on disposable microfluidic chips, in which the virus particles can be concentrated and detected by electrical readout. The obtained data can be transmitted to a monitoring station, where an early warning system ensures the prevention of further infections and an outbreak of the pathogenic viruses.

The project has been funded by the 7th EU Framework Program (Grand Agreement no: 604069)

In the project 14 partners from universities, research institutes, manufacturers, laboratories, end-users and standardization bodies worked together from Denmark Germany, Portugal, Romania, Sweden, Belgium, Hungary, and Italy.

## Work Packages

The Work Packages in the project are listed below:

	Work Package
WP1	Project management
WP2	System engineering
WP3	Design of virus sensor
WP4	Early warning of risk of virus infection
WP5	Virus sensor prototyping
WP6	System integration and prototype manufacturing
WP7	Laboratory test
WP8	Field tests and validation
WP9	Feasibility study
WP10	Dissemination and exploitation

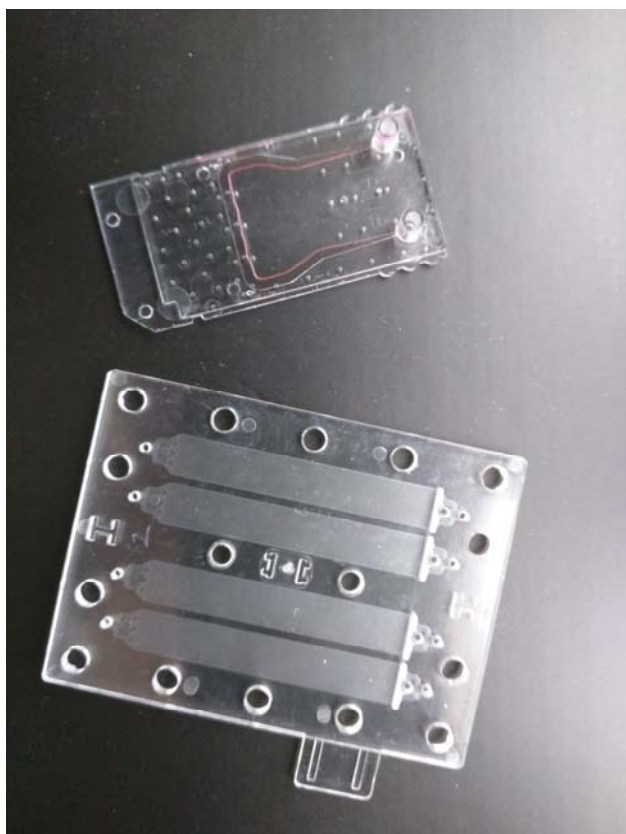
The expected impact of the project is that the system will radically improve the water quality monitoring and thereby will give safe water for the society.

The data from the measurements can be sent to a monitoring station, which is used for early warning and risk assessment for infections by the pathogenic viruses.

## The achieved results

We have developed a computer controlled automated system, which consists of a water sampling and filtering unit and a virus concentration and detection unit based on the input from the end-user partners and on the required virus detection limits.

The system comprises two plastic chips fabricated with state-of-the-art mass producible micro- and nanotechnologies. In these chips the viruses are concentrated and detected, respectively.



*The detection and the concentration chips*

We have also developed a standardization document, a CEN Workshop Agreement (CWA) for detection viruses in water. The standardization strategy provides a map on the standardization landscape on national, European and international level as well as the differentiation to industry standards.

## Recommendations

The clean water management is internationally recognized as a challenging task.

The protection of water networks against pathogenic viruses is crucial. With the guidelines summarized in the standardization document we recommend using a virus monitoring system, which is capable for early warning to prevent the water-borne viral diseases and outbreaks, which pose high risks for public health worldwide.

## References

<http://www.aquavir.eu/>

Other fact sheets 2: The AquaVir sensor system. 3: Application of sensor results for modelling and managing of health risks in water. 4: Development of a “European” map of viruses in water. 5: Standardization in the Aquavir project