



November 2022

ICT4Water Quarterly Newsletter

Note from the editor

On October 19, the cluster members gathered in a workshop as part of the Water Projects Europe event in Brussels. It was a long time ago that we could meet inperson and it was good to see everybody in real life again. In this newsletter you find a summary article of the workshop. The **flash report** about this workshop has been published on the ICT4Water website.

Member project PrimeWater announced that they are sponsor of the upcoming IWA Digital Water Summit in Bilbao. Also in this edition, contributions from our member projects iBathwater, B-WaterSmart, intelWATT, DWC, Sea4Value and PathoCERT.

All the best,

The ICT4Water team



ICT4Water

Water Projects Europe 2022

On October 19, members of the <u>ICT4Water</u> <u>cluster</u>, policy makers from various DGs, and other professionals gathered in a workshop to discuss the digital transition for the water sector and the cluster's activities and plans for the next few years.

The workshop was part of Water Projects Europe, one of a series of events organised by Water Europe. The hybrid workshop attracted about 50 people who attended physically and an online audience who participated remotely. Below a summary of the workshop.

Shaping Europe's digital future: Water policy challenges and developments for the water digital future

Andrea Rubini welcomed the participants on behalf of Water Europe after which **Joachim D'Eugenio** (DG ENV) presented the status of the implementation actions of the Zero Pollution initiative from the past two years. He highlighted the implementation of the zero-pollution action plan which resulted of the Commission proposal for the adaptation of some legislative acts such as the revised Industrial Emissions directive (IED), revised and updated list of emerging pollutants as well as the EC proposal of the new urban wastewater treatment directive (UWWTD). The speaker mentioned that DG ENV are closely following the advancements of relevant projects related to digital solutions to achieve zero pollution ambition, implementing zero pollution ambition

goals for Flagship no.7 which relates to Living Labs for green digital solutions and smart zero pollution.



Keynote speech

Digital Transition in the water sector

Through a video message **Dragan Savic** (WE Digital Water VLT leader) presented his keynote speech called "Digital Transition in the water sector".

AI – Rainfall Estimation Aim • Measure rainfall at high spatial resolution

Al Solution

Pattern recognition

EXETER

Convolutional neural network



KWR

Presentation of the ICT4Water Cluster and introduction to the new action plan.

Lydia S. Vamvakeridou-Lyroudia (KWR) introduced the ICT4Water cluster and presented the new actions for a short-term period (2022-2023). Today the emphasis is on "Intelligent", "Holistic", "Across (themes, sectors)" and "Co-creation". Lydia presented the structure and role of the six thematic groups called Action Groups. Each Action Group works in specific thematic areas and is composed of volunteers from the cluster projects. The groups identify trends, needs and gaps, and collect input from the projects. Together with the EC and especially REA, the groups work on actions and publications that support policy makers.



credit photo: Water Europe

Presentations from the ICT4Water Action Groups

THE WATER DIGITAL FUTURE

Each of the Action Group shortly presented their focus areas, key results and plans for the coming year. During the workshop, the participants worked in groups on the challenges posed by the Action Group leaders after which the groups reported back on the results of their discussion. The outcome of the discussions will feed into the new Digital Water Action Plan of the cluster.



Action Group Enable Data Sharing (EDS): Aitor Corchero (EURECAT) and Roberto di Bernardo (Engineering Ingegneria Informatica SpA) explained that the focus of this group is on interoperability & data standardisation, sovereignty data and services, open and non-discriminatory data and federated /reference architecture. In the coming year the group will focus on the development and extension of smart data models an demonstrate the value of data sharing in the water sector.

Action Group Intelligent and Smart Systems (ISS): Demetris Eliades (KIOS Center of Excellence) and Franck le Gall (EGM) explained that the activities of this group focus on three areas: i) Reinforce better utilization and effective deployment of new technology enablers ii) Improve efficiency and circularity in digitalisation of water use and re-use, and iii) smartening of the water system. Short term action is to update the DSS marketplace and investigate further the definitions, boundary conditions, and experiences of applying digital twins in the water sector.

Action Group Critical Infrastructure Protection (CIP): Eloisa Vargiu (CETAQUA) introduced the main topics for this AG:

- Integrating efforts in providing digital solutions to strengthen the security and resilience of European Water Critical Infrastructures.
- Address technologies for risk management against cyber, physical, natural and human threats.
- Explore and promote collaborative work within and across sectors.
- Promote learning to increase water utilities organisational preparedness under crisis situations.

The plans of the group for the coming year are to link water critical infrastructure data to relevant data-sharing initiatives at European level, to provide informed input to public consultations, and nurture collaboration with other clusters.

Action Group: Actor Engagement and Co-creation (AEC): Mehdi Khoury (University of Exeter) presented the main three actions of the group, being:

- Promotion and development of digital techniques like serious gaming, AR, VR, for stakeholder engagement.
- Raise awareness and involve stakeholders in the design of digital solutions for the water sector.
- Involve citizens actively in data collection.

Action Group Policies (POL): Albert Chen (University of Exeter) provided an overview of the Action Group which focusses on upgrading policies by considering the inclusion of real-time measurements, data sharing and privacy policies, and the promotion of the link with existing and future water legislation. Actions for the coming year focus on the upgrade of policies and the promotion of legislation to enhance data exchange and data sharing across sectors.

Action Group Business Models (BM): Eva Martinez (AQUALIA) gave an overview of the Action Group. The aim of the Action Group is to identify, master build knowledge on innovative data driven business models to create value within the water sector. Business models go beyond data and focus on value creation. Actions for the coming period focus on monitoring the effectiveness of business models and market uptake of digital solutions, identification, monitoring and assessment of main drivers and barriers for market uptake and analysis of digitalisation plans and tenders in Europe.



It was concluded that the digital transition offered many opportunities for the water sector but that this transition is not going fast enough. Actions are needed not only on the technological elements but especially on policy and socio-economic related topics. Synergies between the ICT4Water cluster and clusters from other domains and the tools and initiatives of the European Commission will speed up the digitalisation of the water sector.

Lydia closed the workshop and thanked all participants for their contributions and active participation.

The full Flash Report and presentations can be found <u>here.</u>

A success story on the application of digital and physical ecosystem to



manage wastewater and bathing areas in coastal and inland regions

iBATHWATER is devoted to reducing the impact caused by non-regulated overflows over the natural ecosystems (rivers and coastal areas). Indeed, it focused on the improvement of water quality in bathing areas by reducing the occurrence of water spills and non-regulated overflows.



Figure 1. AquaBIO location and measurements

To achieve these aspects, iBathwater has been demonstrated in Barcelona and Berlin cities. The projects demonstrated an operational and full-scale system to manage wastewater and bathing areas in coastal and inland waters. This system is mainly composed by (i) AquaBio Monitoring tool for the detection of microbiological indicators in real-time; (ii) MOLIBATH as a simulation tool for predicting the dispersion of the negative microbiological and contamination events; (iii) Risk-assessment tools for measuring and predicting the potential micro-biological risks; and (iv) a decisionsupport system to determine operational actuations to minimize the combined sewer overflow events based on the state of the infrastructure and weather predictions.



Figure 2. Waste collection under raining episodes

In terms of quantifiable results, iBATHWATER achieved the following results: (i) a 30% of reduction about the non-regulated volume of overflows in coastal and inland waters; (ii) a 25% of reduction of contamination in the raining episodes; (iii) collection of more than 230m3 of residuals in 2021; (iv) almost 50% of waste collected in bathing areas correspond with wet wipes.

As a conclusion, iBATHWATER results should be considered when reviewing and/or proposing new or existing environmental regulations within the framework of the EU. As, for example, the Water Framework Directive (2000/60/EC), the Bathing Water Directive (2006/7/EC) and the Urban Wastewater Treatment Directive (91/271 / EEC).



PrimeWater at the Digital Water Summit 2022 - Bilbao, Spain

PrimeWater is a Sponsor of the upcoming IWA Digital Water Summit. The <u>Digital Water</u> <u>Summit</u> will gather world-renowned experts who will be involved in plenary sessions, interactive discussions, side events, exhibitions, technical visits, and social events. The Summit is designed to be the reference in digitalisation for the global water sector. During the InnoHub presentation, the <u>PrimeWater Operational Platform</u> will be presented. Interested public and private entities will be able to demo the platform and learn more about the research done during the project.

Info & registration

B-WaterSmart



The Water Europe Marketplace for Circular Economy

The Water Europe Marketplace for circular economy is a flexible platform for finding and sharing innovative solutions and systems in the domains of water, energy, and materials that support the market uptake of innovation. At the Marketplace, you can navigate through available technologies, products, and case studies and upload and promote your own solutions. It is also a place to get in contact with other stakeholders in the circular economy, share ideas, arrange meetings and join forces.

The Water Europe Marketplace, which was first introduced in the NextGen project and further developed in the Ultimate project, is now being expanded under the B-WaterSmart umbrella. The Marketplace will be adopted and permanently curated by Water Europe after B-WaterSmart ends.

The use of the Marketplace is free and can be cancelled at any time. For a small fee, you also can upload your own products and utilize advanced algorithms to advertise them to potential stakeholders via the Marketplace's pages.

Register here for the Water Europe Marketplace: <u>Servizio Antispam ha rilevato un</u> possibile tentativo di phishing da "click.mlsend.com" https://mp.watereurope.eu/

Read more about the B-WaterSmart project: <u>Servizio Antispam ha rilevato un</u> possibile tentativo di phishing da "click.mlsend.com" https://b-watersmart.eu/



intelWATT

Embracing digital transformation and redefining the future of

industrial water: how we make it work.

The digital transformation is here, and we can no longer neglect its importance. Redeveloping your plant business afterwards is a costly and time-consuming matter. The common goal for industries and the water sector is to achieve optimal management of industry processes, keep costs low and make the plant resilient with water as an important enabler. However, we can only make this digital transformation work if digital becomes a part of the industry business DNA, with a strong focus on cybersecurity. Redefining the future of industrial water starts with the integration of digital solutions.

Key client issues

Like any other activity, high-tech industrial activity has high performance challenges that must be coupled with high reliability and activity monitoring challenges.

- The need to be able to visualise and monitor the activity of their industrial activities
 - Reduce decision times
 - To have a common base for visualising the data produced by the activities
 - sensors
 - weather
 - alarms
- The need to efficiently conduct business with data-driven decision making
 - o Gain insights into data
 - Improve processes and design
 - Adopt a data-driven culture
- Reduce operating costs:
 - Adopt cost effective planning
 - Avoiding breakdowns
 - Improve performance indicators

- o Reduce the use of reagents
- Reduce energy expenditure
- Improve carbon footprint
- Keep the license to operate



Photo ex. of RO monitoring system, showing a real case of wwtp operation with online monitoring

What we solve:

• Improved remote collaboration between the distinct roles enables quicker decisions based on the same input.

- Remote site visits with internal teams, external suppliers, and contractors encourage collaboration while reducing travel expenses.
- The access to a unique place with the as-is documentation increases engineering productivity, reducing risks, and avoiding late rework costs.
- Giving access to our platforms using mobile devices brings the data and information where it is needed, increasing the productivity of operation and maintenance teams.

Data exploitation and enrichment thanks to machine learning and artificial intelligence modules that enable numerous business benefits.

We are committed to making data analysis possible and easy with numerous visualisation tools. We offer cross-analysis of data from different sites and its advanced analysis thanks to a multitude of different control screens and graphs. This wealth of data produced is more valuable as our expertise in machine learning and artificial intelligence through their predictive capacity promotes predictive site maintenance, equipment performance, reduction in the use of reagents and finally the improvement of the ecological footprint of industrial activities on site. A solution designed to reliably support plant operators daily.

Plant operators benefit from dedicated support available 24/7, with reliable and historical data, allowing them to have an overall view of the activity at any time. In addition, they are supported daily by an available help desk in their development of skills through personalised training programmes and comprehensive instruction manuals.

DWC

5 digital tools for a safer and more efficient urban water management



What if an app could tell you if a river or

a lake is clean enough to jump in? What if wastewater could be safely reused for irrigating crops? What if low-cost sensors could warn water utility managers about an upcoming overflow in the sewers?

Following #UrbanOctober by UN Habitat, on 17 October digital-water.city launched the one-month campaign <u>#SafeUrbanWater</u> to highlight 5 digital water solutions. The solutions were developed as part of the project and will make urban water management safer and more efficient.

The 5 solutions have been tested in Berlin, Paris, Milan and Sofia and present a high potential for market transferability to other European cities. Al or decision support systems are only a couple of examples of the innovative technologies used to develop these tools.

The campaign dedicated one week to each solution to give visibility to their specific features and bring to attention how relevant they are for their users, which range from water utility managers to citizens or local governments.

Below you can read the interviews with the solution developers that were published during the campaign:

- Low-cost temperature sensors for real-time CSO and flood monitoring
- <u>Sensors for real-time in situ e.coli and enterococci measurements</u>
- Machine-learning based Early Warning System for bathing water
- Mobile application for asset management of drinking water wells
- <u>Early Warning System for safe water reuse of treated wastewater for</u> <u>agricultural irrigation</u>



5 digital solutions #SafeUrbanWate





Sea4Value

Brines as a source – Quickfire interviews

The European Union (EU) is highly dependent on foreign markets for its supply of critical raw materials (CRM, as defined by the European Commission). The European Horizon2020 project '<u>Sea4Value</u>' aims to contribute to the solution of this issue by extracting minerals from seawater brine resulting from desalination processes.

Starting with an analysis of 150 samples of seawater and brines at different locations we have identified 10 - mainly critical - raw materials to focus our extraction technologies on. Furthermore, we found that the mineral composition is highly location-dependent. With different cutting-edge mineral extraction technologies being

developed within the project and installed in a modified shipping container - the 'moving lab' - , we want to test this mineral specific recovery on site.

This is a potential solution that could not only decrease the dependency and reliance on markets outside the European Union, but also turn brine into a valuable resource. Desalination plants diversify from purely water factories into chemical factories, where there is a stream to extract chemical compounds in addition to the production of fresh water. We started an interview series to explain important aspects of the project.

Click <u>here</u> for the full article and interviews



PathoCERT

Pathogen Contamination

Emergency Response



Technologies for multimodal data analysis

During emergencies caused either by abrupt incidents or by dynamically escalated incidents from consecutive background events, it is crucial for First Responders and Water Authorities to gather information from open databases (e.g., SCADA system, satellite images, social media), as well as from sensors deployed at the emergency field, to improve their situational awareness and their ability to control and mitigate emergency situations involving waterborne pathogens.



Figure: Results from the PathoSAT image analysis system and the PathoTWEET platform for monitoring contamination-related social media posts.

To this extent, **PathoSAT** collects open data and images from satellites, analyse them to identify water contaminations and their extent and relays them to PathoCERT's platform. **PathoTWEET** analyses anonymized data and photos from social media to assess the occurrence, severity and extent of water contamination events, which can be used to estimate the potential risk as well as the contaminant source.

In the operation field, this role is covered by the **PathoSENSE IoT Gateway**, which establishes a two-way communication with the PathoWARE IoT Platform and implements a bridge between the field and the higher-level command and control. In addition, the PathoSENSE IoT Gateway offers the capacity to perform field-level analytics, e.g., to use state-of-the-art techniques to fill-in data that might be missing due to damaged communication links or flawed sensors, apply processing at lower level and minimize the communication cost, etc.



Figure: Architecture of the PathoSENSE IoT Gateway

To align PathoCERT's various components with the needs of the first responders, Community of Practice (CoP) meetings were organized with more than 100 participants, where the scenarios are formed based on the usability of the presented technologies.

Link to full article: <u>Servizio Antispam ha rilevato un possibile tentativo di</u> phishing da "click.mlsend.com" https://zenodo.org/record/7304218#.Y2teHnZByUk

Agenda