

IC4WATER RDI FUNDED PROJECTS BOOKLET

Project: IoT for Supervision and Control of Water Systems

Acronym: IoT.H2O

Project Coordinator: Dr. Harald Roclawski, roclawsk(at)mv.uni-kl.de

Institutions: TU Kaiserslautern

Country: Germany

Project partners:

Institutions: Technische Universität Kaiserslautern Lehrstuhl für Strömungsmechanik und Strömungsmaschinen

Country: Germany

Contact points: Dr. Harald Roclawski, roclawsk@mv.uni-kl.de, Anika Theis, anika.theis(at)mv.uni-kl.de

Project partners:

Institutions: Federal University of Minas Gerais, Centro de Pesquisas Hidráulicas e Recursos Hídricos

Country: Brazil

Contact points: Prof. Dr. Aloysio Saliba, asaliba(at)ehr.ufmg.br

Project partners:

Institutions: Liege University, Research group Hydraulics in Environmental and Civil Engineering

Country: Belgium

Contact points: Prof. Benjamin Dewals, b.dewals(at)uliege.be

Project partners:

Institutions: Institut national des sciences appliquées de Rouen, LITIS LAB, MIND Group

Country: France

Contact points: Prof. Laurent Vercoouter, laurent.vercoouter(at)insa-rouen.fr

Project partners:

Institutions: Ingenieurgesellschaft GmbH, Aachen

Country: Germany

Contact points: Dr. Thomas A.G. Krätzig, infoline(at)dr-kraetzig.com

Project structure (WPs description):

WP1: Water network modelling: Modelling water networks, model evaluation and control systems comparison.

WP1.1: Computational modelling: (CPH) Developing computational hydraulic models of distribution networks (refer to WP6).
WP1.2: Model validating: (CPH) Validating computational model using reduced physical water distribution network model.
WP1.3: Control comparison: (CPH) Comparing SCADA and IoT control concepts at physical water network model.
WP2: Placing and virtual sensors: Optimized placing of IoT nodes and network components, development of virtual sensors.
WP2.1: IoT nodes placing: (HECE) Optimized placing of IoT nodes (flow,pressure, others) using hydraulic methodology.
WP2.2: Virtual sensors: (HECE) Development of hydraulic model based virtual sensors for water quality (e.g. residual chlorine, water aging)
WP2.3: Energy recovery: (HECE) Hydraulic model based placing and sizing of energy recovery systems (including robust estimation of energy production potential and economic value).
WP3: Pump operation: Optimization of pump operation and condition monitoring
WP3.1: Energy efficient pump operation: (SAM) Hydraulic model supported energy efficiency optimized Pump operation.
WP3.2: Pressure management: (SAM) Model supported pump control for intelligent pressure management.
WP3.3: Condition monitoring: (SAM) Adapting / developing IoT condition monitoring sensors for pumps, lab and field testing.
WP4: Multiagent technology: Development of Multiagent technology for decentralized AI – Artificial Intelligence for water networks operation.
WP4.1: Demand driven optimization: (LITIS) Development of optimization strategies for demand driven water network optimization.
WP4.2: Incident recognition: (LITIS) Development / implementation of incident recognition algorithms (pipe bursts, urban flash flood incidents, situation adapted generation of alarms).

WP4.3: Incident Recovery: (LITIS) Development/implementation of incident recovery algorithms to increase resiliency
WP5: IoT network and digital twin: Developing, adapting and testing of water systems adequate IoT networks and sensing systems, water system digital twin.
WP5.1: IoT network: (KI) Selection, developing prototypes of task-specific IoT network(s) including sensors for pressure and flow, functional laboratory and field testing. (Field layer, network layer, application layer.)
WP5.2: IoT system: (KI) Setting up of an integrated pilot IoT system (pressure / flow nodes, gateway, application), laboratory and field testing.
WP5.3: Digital twin and IoT: (KI) Developing simplified hybrid models (digital twin and real sensors) of water networks for testing IoT concept and optimization of controls.
WP6: Field deployment: (Field) survey, field deployment of components for testing, setting up of an integrated IoT system.
WP6.1: Network selection: (All): Selection of networks for field tests and modelling (water utilities in Belo Horizonte, Liege, Kaiserslautern).
WP6.2: Network survey: (All): Studying selected water networks, collection of network data and characteristics.
WP6.3: Components testing: (All) Testing of individual components (IoT devices, gateways, networks).
WP6.4: System test: (All) Testing complete field installations and integrated IoT system. Evaluation.
WP7: Project management: Project management
WP7.1: Project coordination: (SAM) Project coordination
WP7.2: Project communication: (SAM) Implementation / operation of cloud service for data exchange, communication.

WP7.3: Project meetings: (All) Kick-off meeting, project meetings

WP7.4: Dissemination

Contact person(s) for Communication activities: Dr. Harald Roclawski, roclawsk(at)mv.uni-kl.de

Contact person(s) for Dissemination activities (for Open data & Open Access activities): Dr. Harald Roclawski, roclawsk(at)mv.uni-kl.de