



Proactive Management Mechanisms for a Secure Water Future

CYBERWATER 2018

Workshop on physical and cyber safety in critical water infrastructure

WINGS ICT Solutions Ltd.
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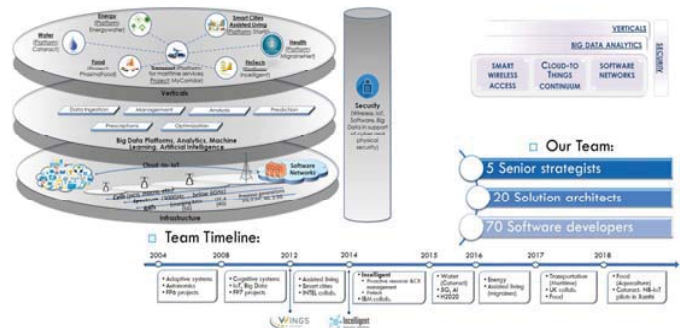
Outline

- About WINGS
- Water security threats
- The smart connected water opportunity
- WINGS Solution: “proActive mAnagement mechAnisms foR smArT Connected waTer” (CATARACT) platform
- Demonstration

About WINGS (activities, team)

Participants: WINGS

WINGS is an SME which focuses on the **development of software** for various **vertical sectors** (namely, water, energy, smart cities, food safety, health, transportation, finance) through **advanced wireless, cloud/IoT, big data and security technologies**



Water Security Threats

Water security threats

Natural Disasters

- Weather phenomena (floods, hurricanes)
- Earthquakes
- Pandemic flu

Systemic security management issues

- Complex and aging infrastructure
- Infrastructure and equipment failures
- Limited resource availability and planning
- Declining workforce
- Heavy reliance on other critical sectors subject to system failures (energy, telco)
- Outdated requirements and design to evolving threats
- Economic costs of preparation and response

Intentional malicious acts

- Contamination
- Sabotage
- Terrorism
- Cyber threats and events

Inadequate corporate culture

- Inadequate coordination and information sharing during preparation, response and recovery
- Technology interoperability issues
- Lack of effective training and best practices
- Consequence ignorance and competing priorities from utilities, customer base and government

Water security threats worldwide

At least **1.8 billion people**, world-wide, are estimated to drink water that is crucially **contaminated** [source: UNICEF]



47% of EU surface water was estimated not to meet good **ecological** status, the **chemical status** of 40% of surface waters is even **unknown** [source: European Commission]



20-40% of Europe's water is being **wasted**, mainly due to **leakages** in the supply system [source: European Commission]

Non Revenue Water (NRW) level in many Greek **DEYA** reaches up to **70%**



Cyber threats: one of the four most serious national security challenges facing the UK [source: UK Government]

In 2014, **at least 6%** of the reported cyber incidents on critical infrastructures targeted the **water sector** of the US [source: ICS-CERT]

Indicative cases in Greece and abroad



Chicago, USA, April 2018

Chicago's **drinking water is full of lead**



Thessaloniki, Greece, March 2018

Pipe break and leakage in EYATH, large portions of the city **without water supply for many days**



Heraclion, Greece, March - April 2018

Daily interruptions of water supply due to **water scarcity and breaks**



Evros, Greece, March 2018

Flooded Evros prompts call for state of emergency



Akraifnio, Greece, March 2018

Warning for **contamination in school**, 45 out of 60 students got ill

Smart Connected Water Opportunity

Opportunity for various stakeholders



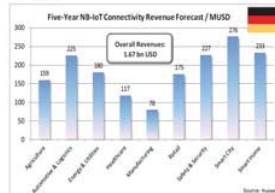
Global water **control and monitoring solutions** market worth **\$22.8 billion** in 2017 with a projection for **\$30.1 billion** in 2021 [Source: CWI]

Smartly connected through NB-IoT

Power efficiency
Better penetration
Ubiquitous coverage
Low device unit cost
High reliability
Strong security



Revenue uplift of 2.2% for operators thanks to the launch of NB-IoT services
(just for connectivity, will be higher if moved up to the value chain)

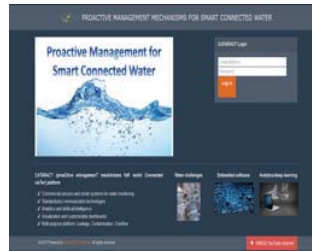


WINGS Solution

CATARACT

"proaCtive mAnagemenT mechAnisms foR smArT Connected waTer"
CATARACT platform

- Leverages on:
 - Commercial and R&D based sensors
 - Standardized communication technologies including NB-IOT
 - Analytics and Artificial Intelligence
 - Visualization and customizable dashboards
 - Security technologies



Solution features

Sensors and Actuators 1. Water Quantity and Quality Control 	Communication Technologies 2. Data Collection and Transmission 	Analytics 3. Data processing and analysis 	Dashboard 4. Real time data monitoring, data visualization
a. Physical (Flowrate, Pressure, Conductivity, Temperature) b. Chemical (pH, ORP, Chlorine)	a. Gateways (Arduino, Raspberry) b. Protocols (Modbus, DNP3, IEC 870-5-104, IoT protocols) c. Technologies (NB-IoT, LoRa/LoRaWAN, Zigbee, Sigfox, Bluetooth)	a. Complex Event Processing b. Predictive Analytics c. Data Correlation d. Data Management	Use Cases & Benefits Uses Cases <ul style="list-style-type: none"> ■ Leakage ■ Contamination ■ Blockage ■ Overflow ■ Smart Metering ■ Prediction of Demand & Demand-Supply Matching Benefits <ul style="list-style-type: none"> ■ Public health ■ Optimized OPEX

Security measures: users' authentication/authorization, data encryption, isolated databases behind firewalls

International presence

Awarded with WssTP Water Innovation SME Award 2016



- WssTP is the European Technology Platform for Water
 - Consists of **178 company members** and a network of more than **700 individuals** from Industry, research, technology providers, policy makers and water users
- **Innovations** and **pilots** in smart sensors and management platforms
 - H2020 PROTEUS, <http://www.proteus-sensor.eu/>



WINGS and NB-IoT Water Pilots DUTH, Xanthi



Sensor deployment in Main Supply and Student Residence for Water Quality Management

WINGS and NB-IoT Water Pilots OTE, Athens, Smart Metering

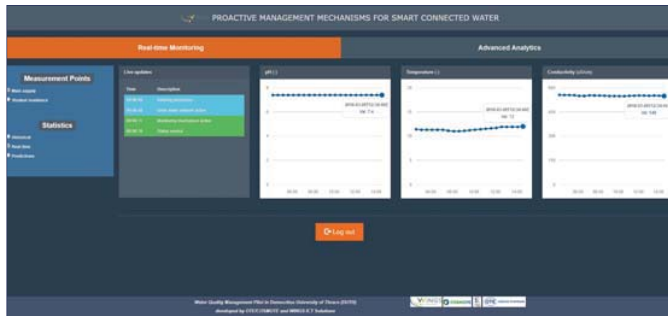


- Consumption monitored at regular (user defined) basis, currently 8 hours
- 2 different modules & operations
 - Measurement and translation of pulses to litres (universal to all meters)
 - Retrieval of consumption using M-Bus protocol (only for meters supporting M-Bus)
- Intelligence for event detection and notifications (alerts for leakages)

Smart meters deployment in OTE building at Ilissos for Smart Water Metering

Demonstration

Real-time monitoring and historical data based on DUTH remote sensors

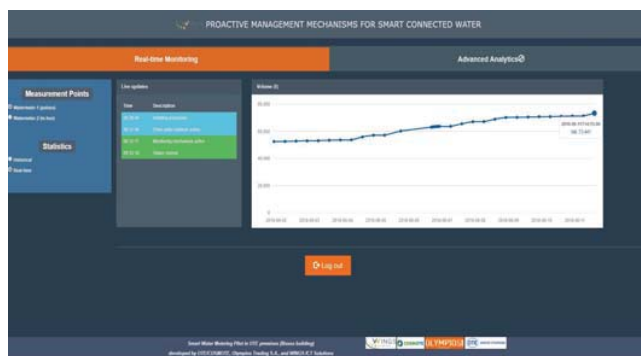


Advanced analytics based on DUTH remote sensors



Artificial Intelligence based algorithms

OTE, Athens, Smart Metering



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Please find the detailed technical company profile at

<https://goo.gl/BYmOh4>

