Clean Water Monitoring (CWM)

Development of a multi-parameters probe for real-time monitoring of water quality in networks

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SIG

OrbiWise

Distributor needs

Real-time Monitoring of water quality parameters

- Turbidity
- Conductivity
- Flow Velocity
- Residual Chlorine
- Temperature
- Pressure

Hydraulic modelization of water networks (calculations)

Optimization of the operation of water facilities

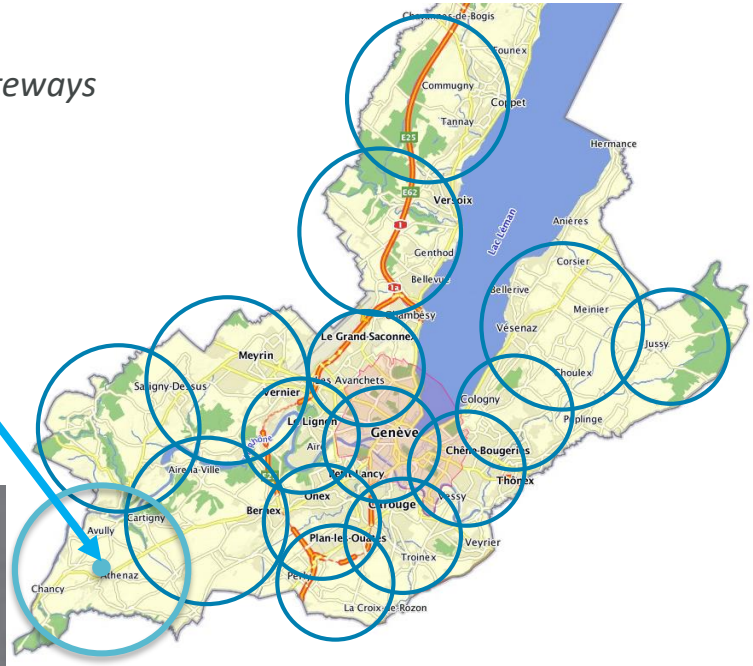
Anticipation of pipes renewals

General Principle of CWM

Visual Tools

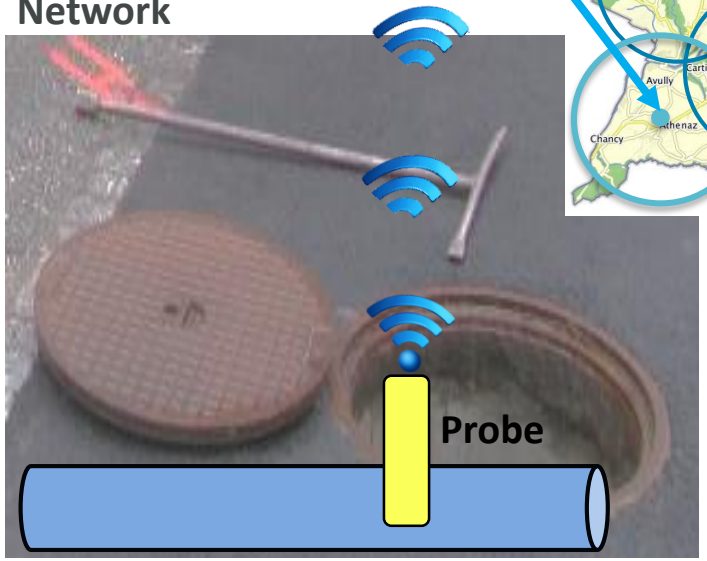
Interface

Gateways



Distributor :
Monitoring center

Communication Network



Drinking water network
(on buried pipe)

- *Sensors*
- *Embedded software*
- *Wireless communication*
- *Protocol & Alerts*
- *Mechanical integration*

A new industrial tool … innovative, universal, open & evolutive

6 physicochemical parameters in 1 probe

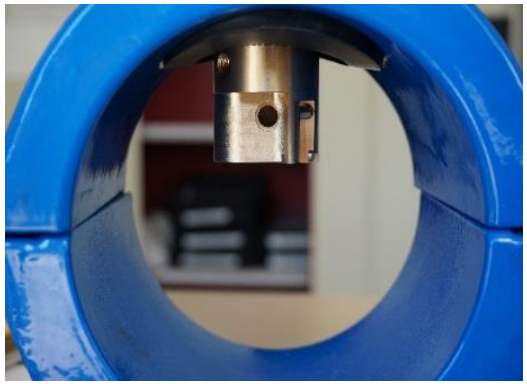
Compact

- ▶ Diameter : 40 mm
- ▶ Length : 300 mm

Directly installed in a pipe

- ▶ Without interrupting the water distribution

Installation at any point of the water network



Interesting cost

- ▶ Production cost ≤ 1’500 $

Real-time measurement

- ▶ User settings (sampling rate)

Wireless communication & low consumption

- ▶ LoRaWAN® Protocol

Energy autonomy

- ▶ *minimum* 6 months
- ▶ 1 standard AA battery
- ▶ no electrical wire

The Probe

The Probe

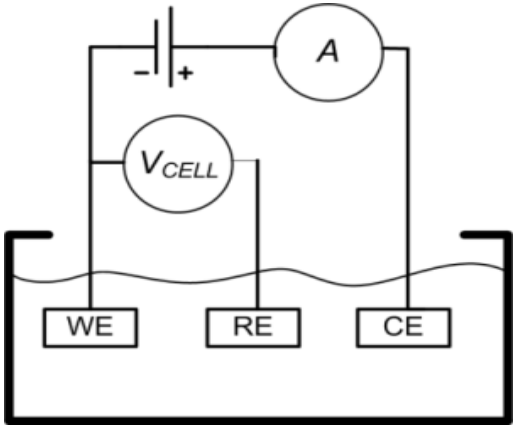
Portes ouvertes de l'Hepia – mars 2017

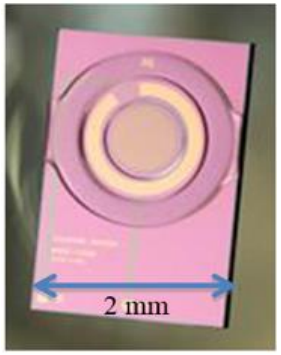
The Sensors

PARAMETERS	MEASURING RANGES	RESOLUTION ACCURACY	SWISS STANDARD
Turbidity	Range 1 : 0.1 to 1 NTU Range 2 : 1 to 10 NTU	0.1 ± 0.1 NTU 0.5 ± 0.5 NTU	1 NTU
Residual Chlorine	Range 1 : 0.01 à 0.2 mg Cl_2/L Range 2 : 0.1 à 0.5 mg Cl_2/L	0.01 ± 0.01 mg Cl_2/L 0.1 ± 0.1 mg Cl_2/L	0.1 mg Cl_2/L
Temperature	0 à 30 °C	0.1 ± 0.1 °C	8 … 15°C
Flow Velocity	0 à 2 m/s	0.1 ± 0.1 m/s	-
Pressure	0.1 à 16 bar	0.1 ± 0.1 bar	-
Conductivity	5 à 1'000 µS/cm	5 ± 5 µS/cm	200 … 800 µS/cm

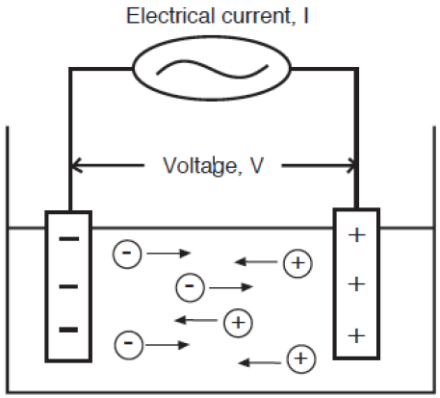
The Sensors

Residual Chlorine

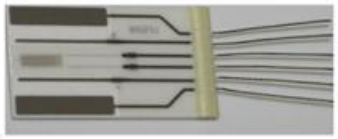




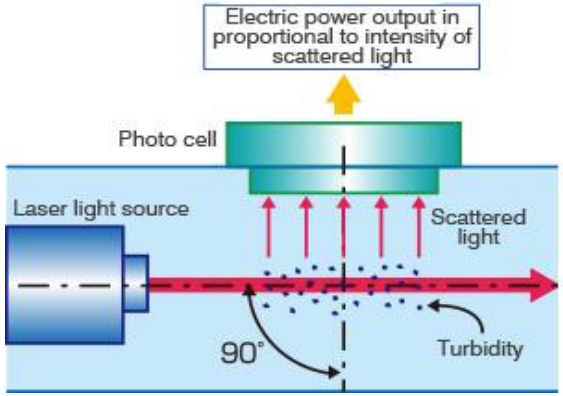
Conductivity / T°C



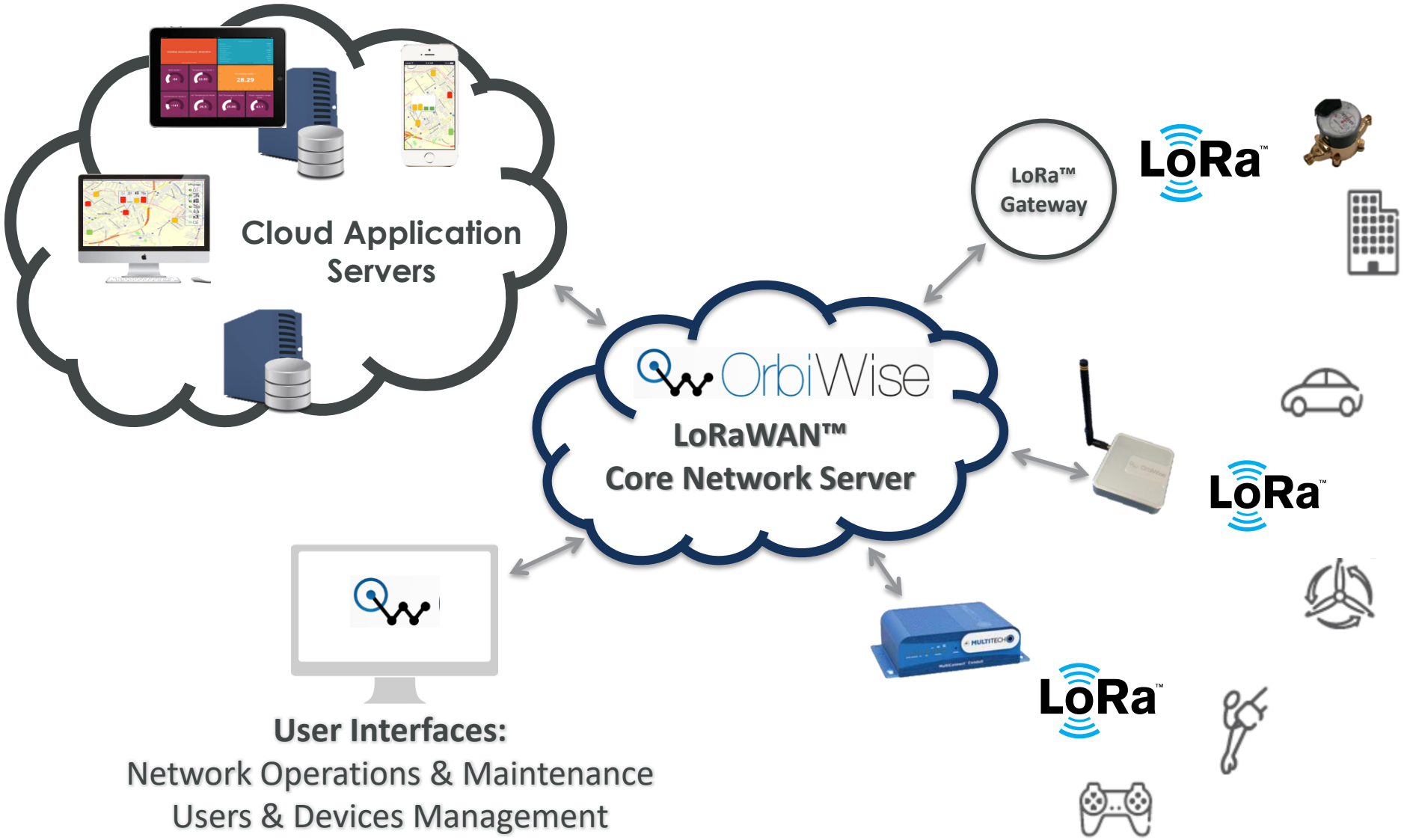
15 mm x 55 mm x 1.2 mm



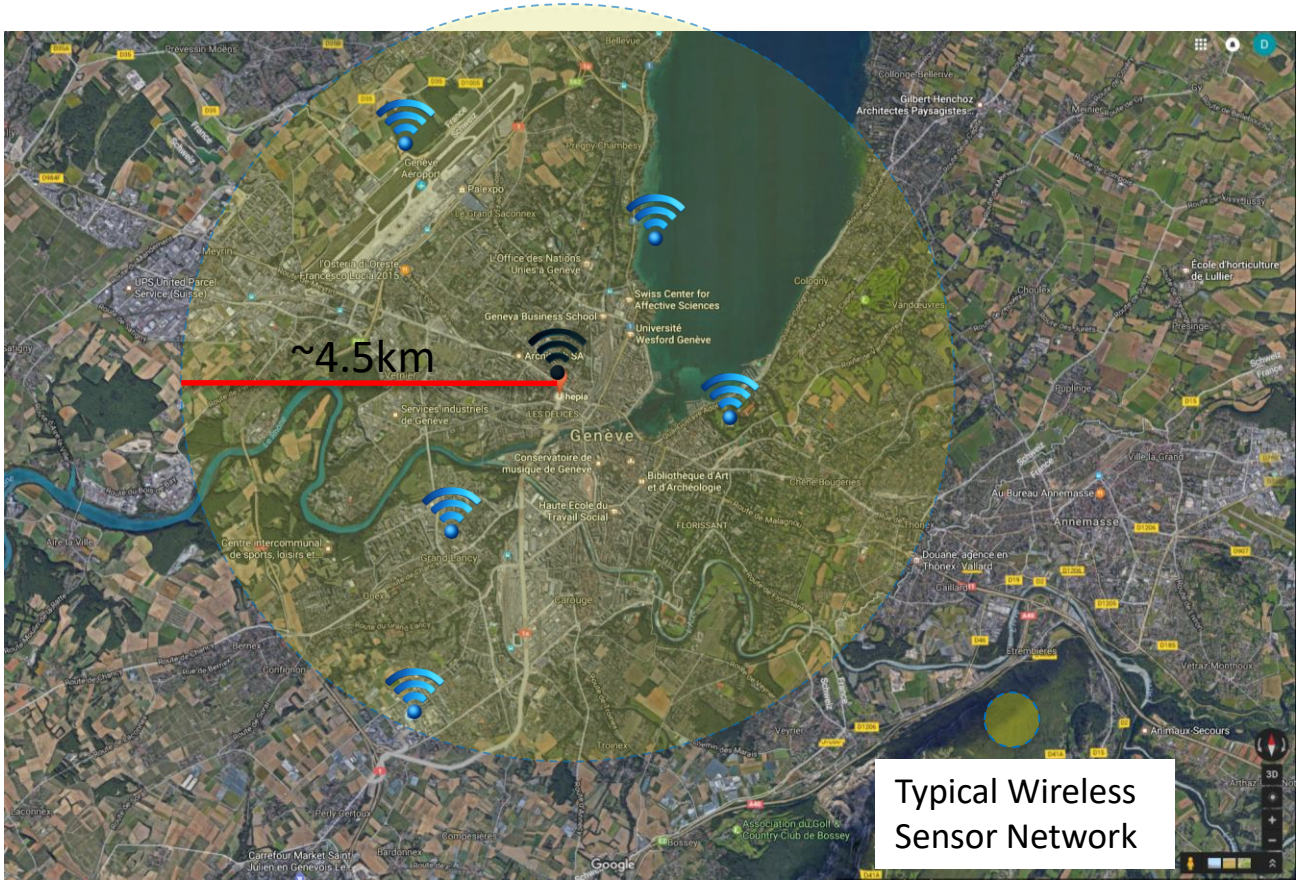
Turbidity



LoRAWAN™ IoT Network



LoRAWAN™ IoT Network

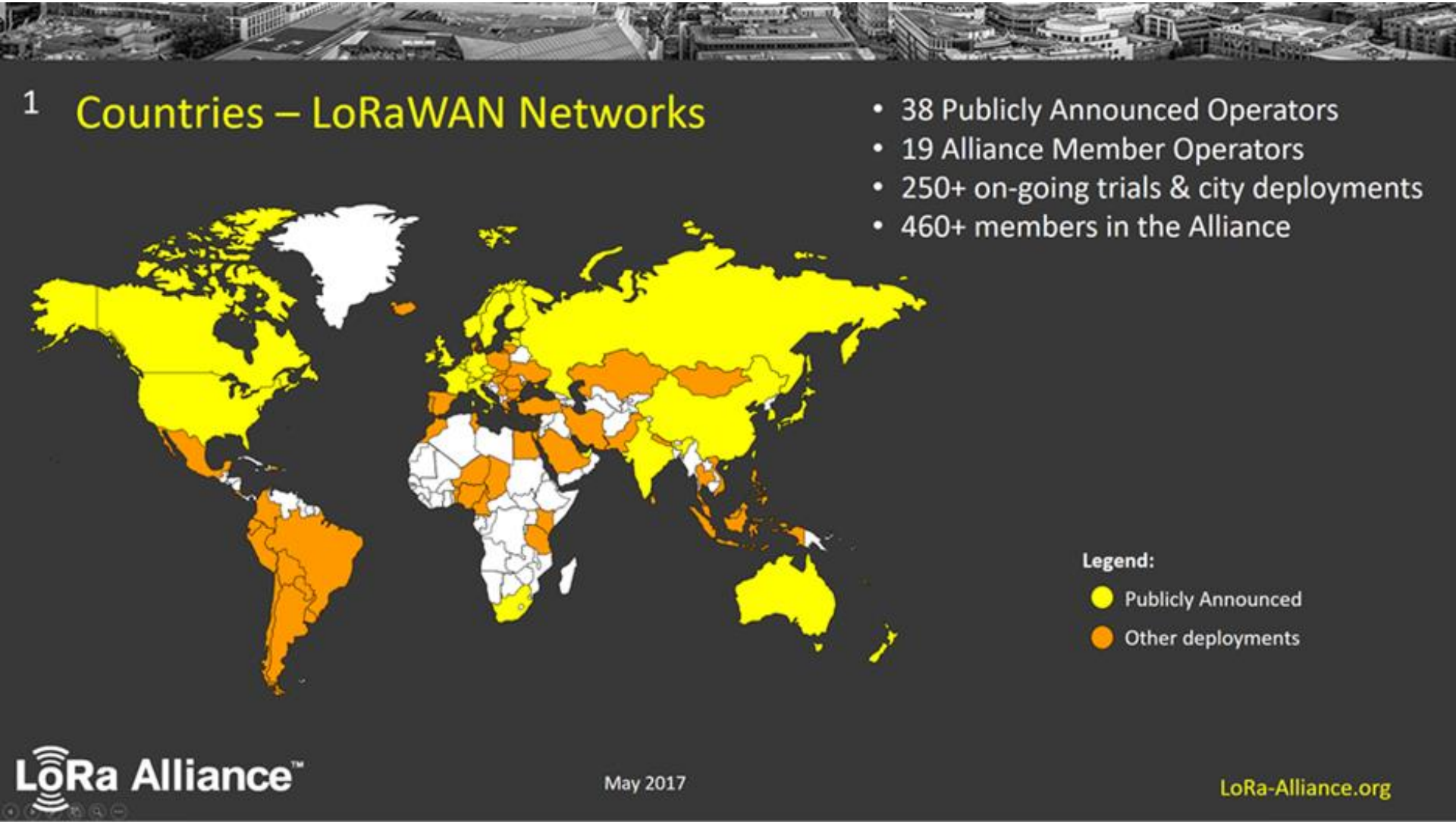


Outdoor Gateway (GW)

Device

- Very low cost wireless infrastructure in unlicensed bands
  - End-device battery can last 10 years on one AA battery

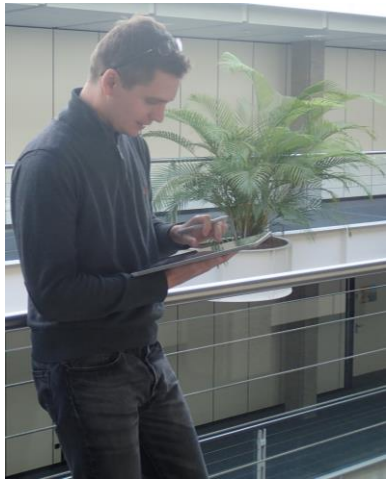
LoRAWAN™ IoT Network

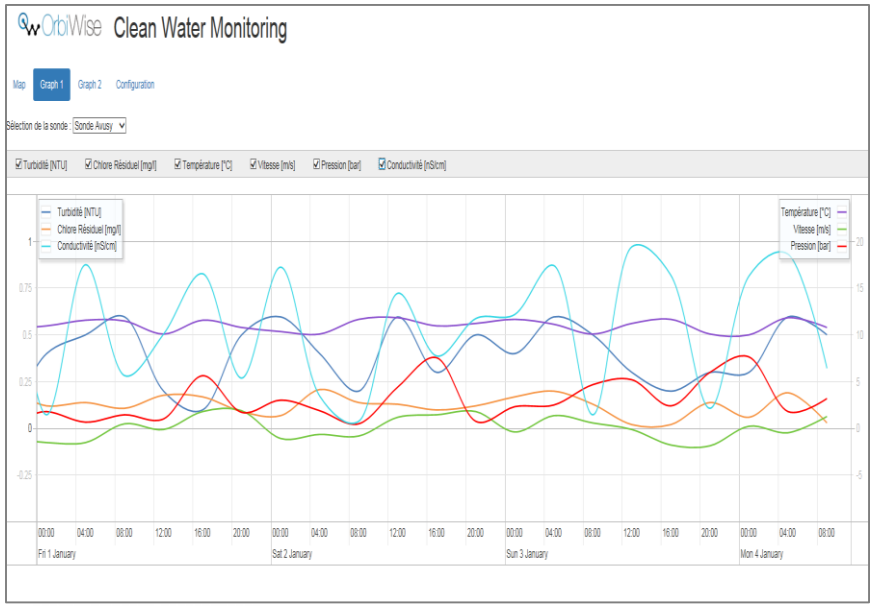


Standard User Interface

Anywhere

At any time





Acknowledgements