

Clean Water Monitoring (CWM)

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

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Distributor needs



Real-time Monitoring of water quality parameters

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



Hydraulic modelization of water networks (calculations)

Optimization of the operation of water facilities



Anticipation of pipes renewals

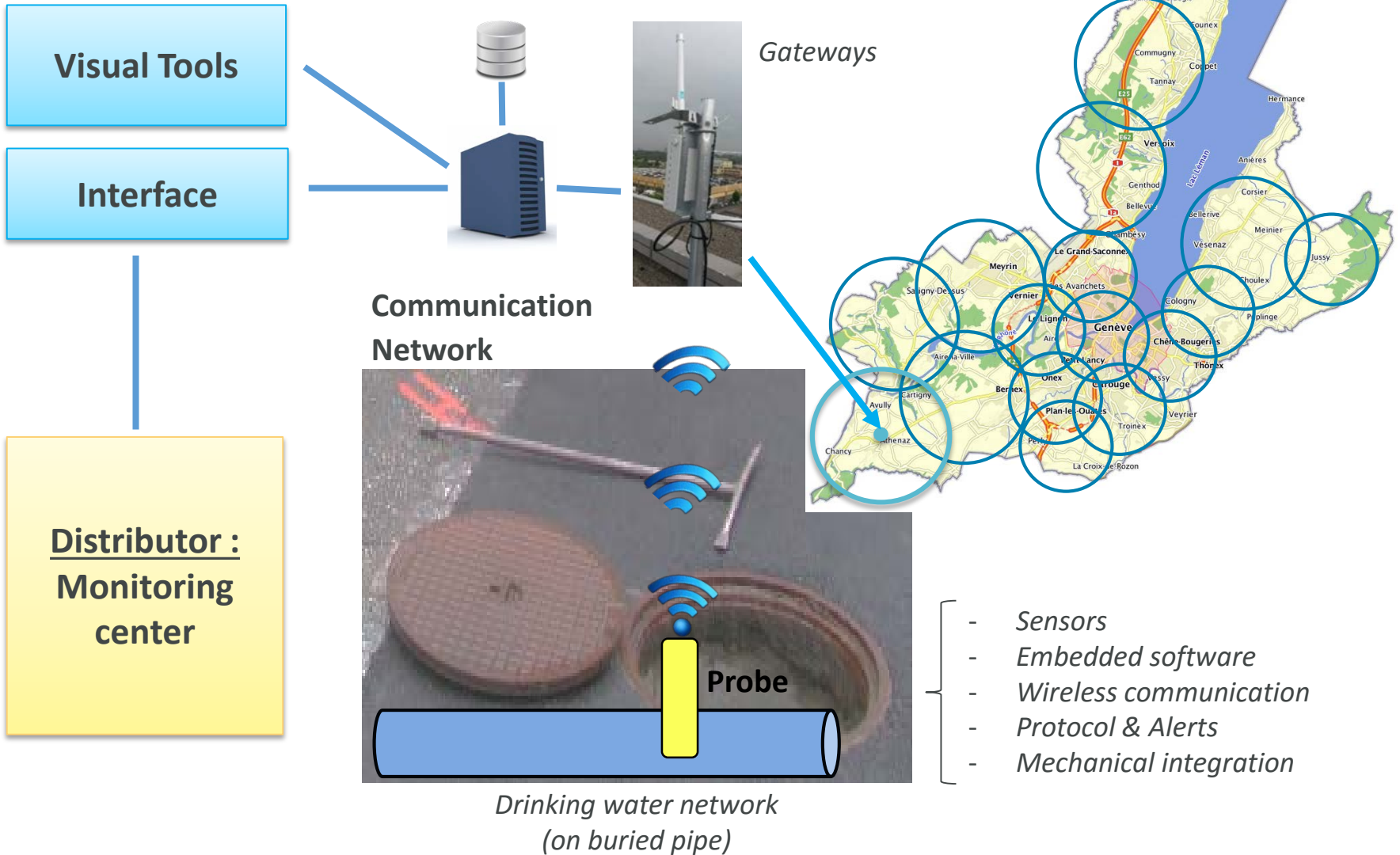


General Principle of CWM



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



Compact

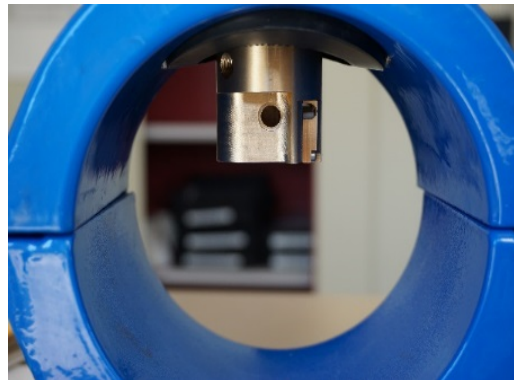
- ▶ Diameter : 40 mm
- ▶ Length : 300 mm

Directly installed in a pipe

- ▶ Without interrupting the water distribution

Installation at any point of the water network

6 physicochemical parameters in 1 probe



Interesting cost

- ▶ Production cost \leq 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



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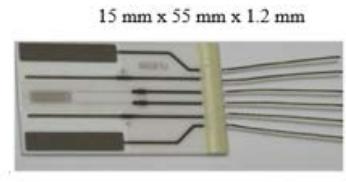
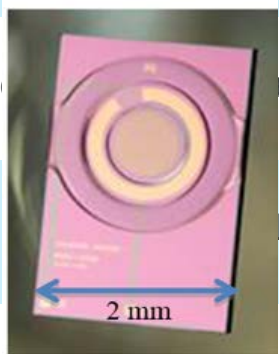
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The Sensors



PARAMETER	RESIDUAL CHLORINE	CONDUCTIVITY / T°C	TURBIDITY
Measuring Range	0.1 to 10 mg/l	0.01 to 1000 µS/cm	0.1 to 1000 NTU
Resolution Accuracy	± 0.1 mg/l	± 0.1 µS/cm	± 0.1 NTU
Swiss Standard	Residual Chlorine	Conductivity	Turbidity
Diagram			
Flow Velocity	0 to 2 m/s	0.1 ± 0.1 m/s	-
Pressure	0 to 16 bar	± 0.1 bar	-
Conductivity	5 to 1'000 µS/cm	5 ± 5 µS/cm	200 ... 800 µS/cm

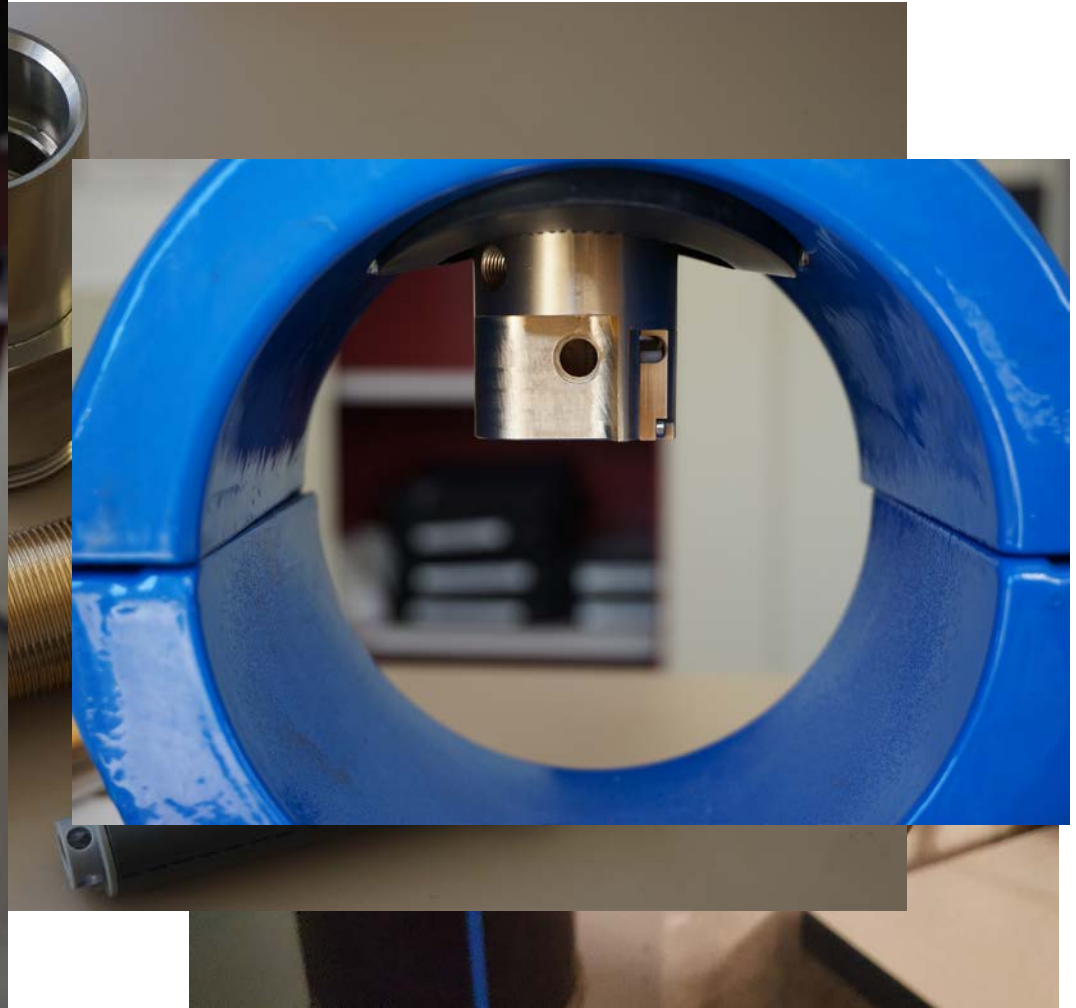


The Mechanics



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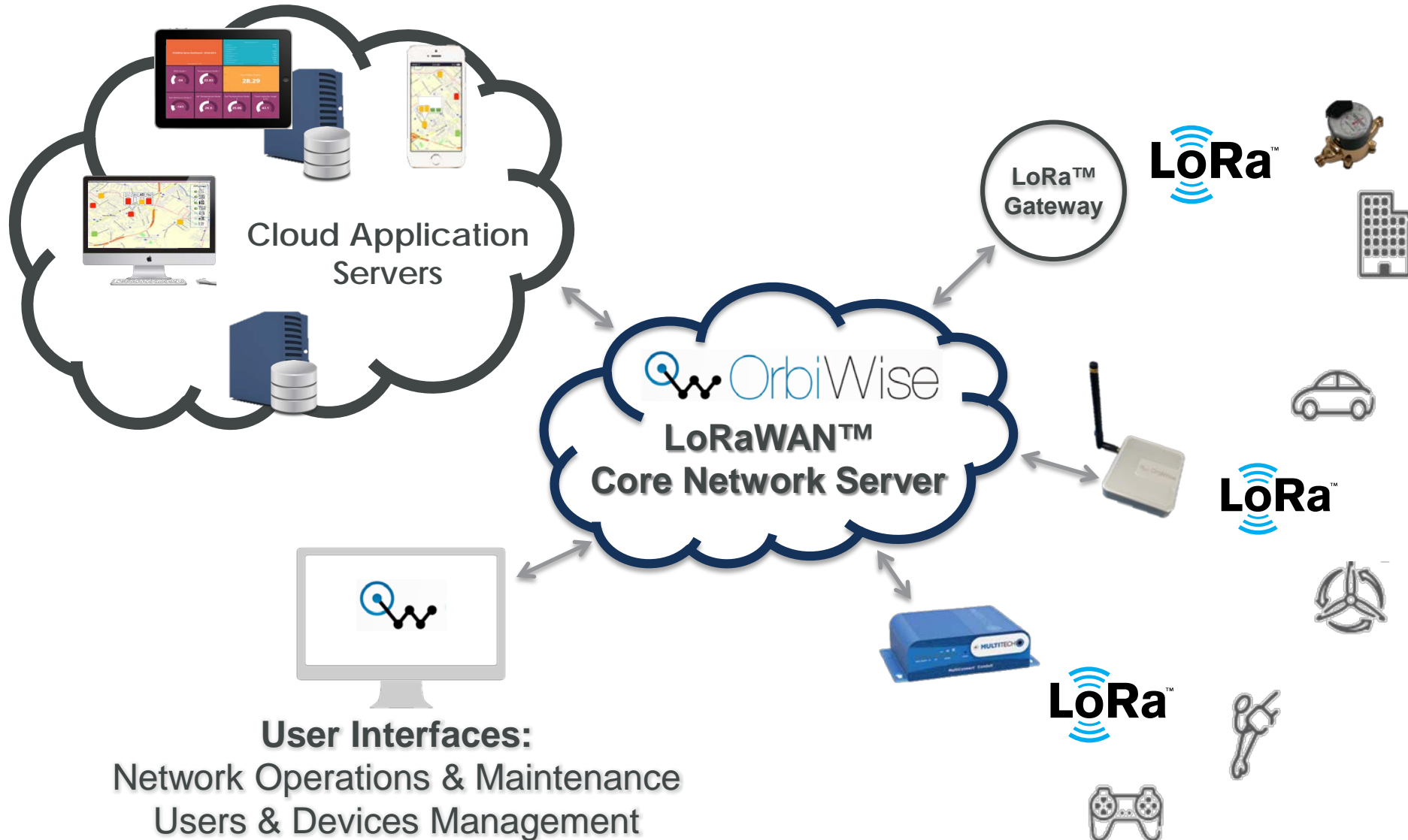


LoRAWAN™ IoT Network



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LoRAWAN™ IoT Network



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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

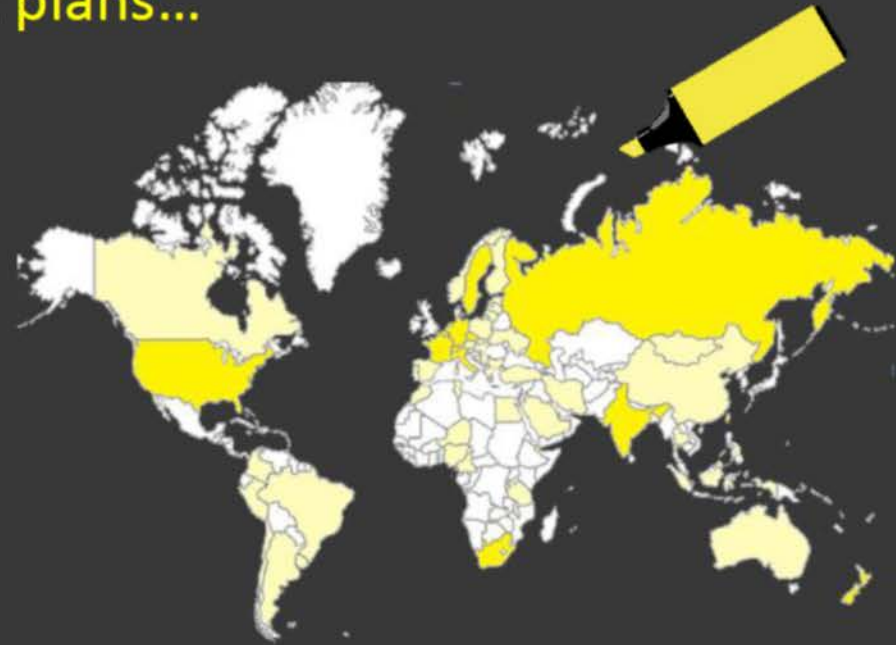


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LoRaWAN – National deployment plans...



27 Announced national deployments
> 150 regional or city deployments

Standard User Interface

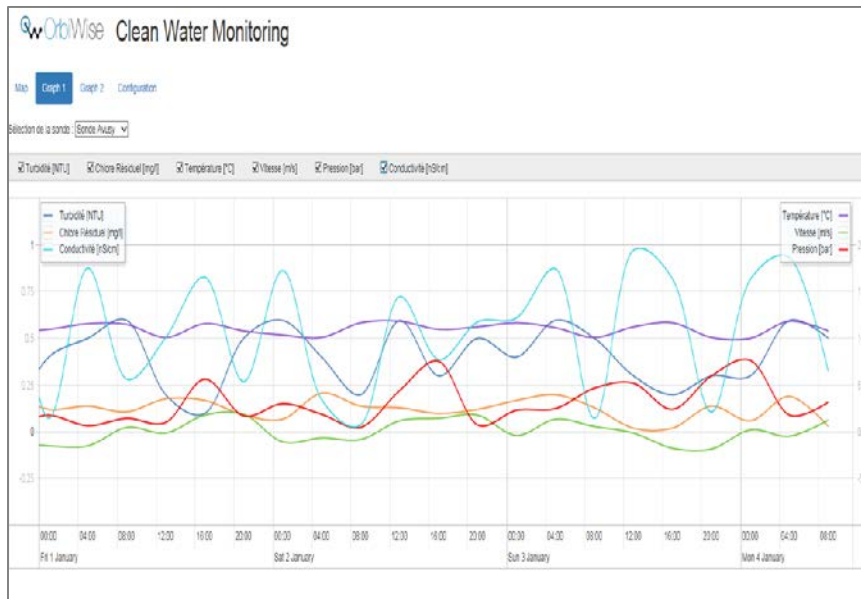
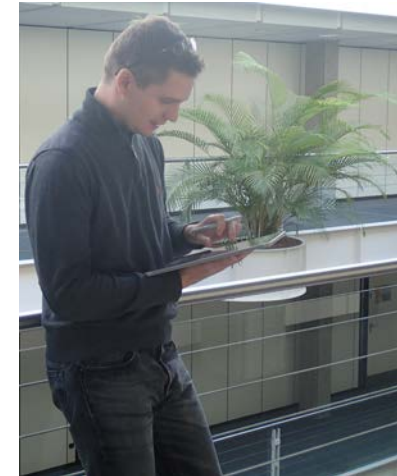


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Anywhere
At any time



Acknowledgements



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Institut inSTI



Thank you