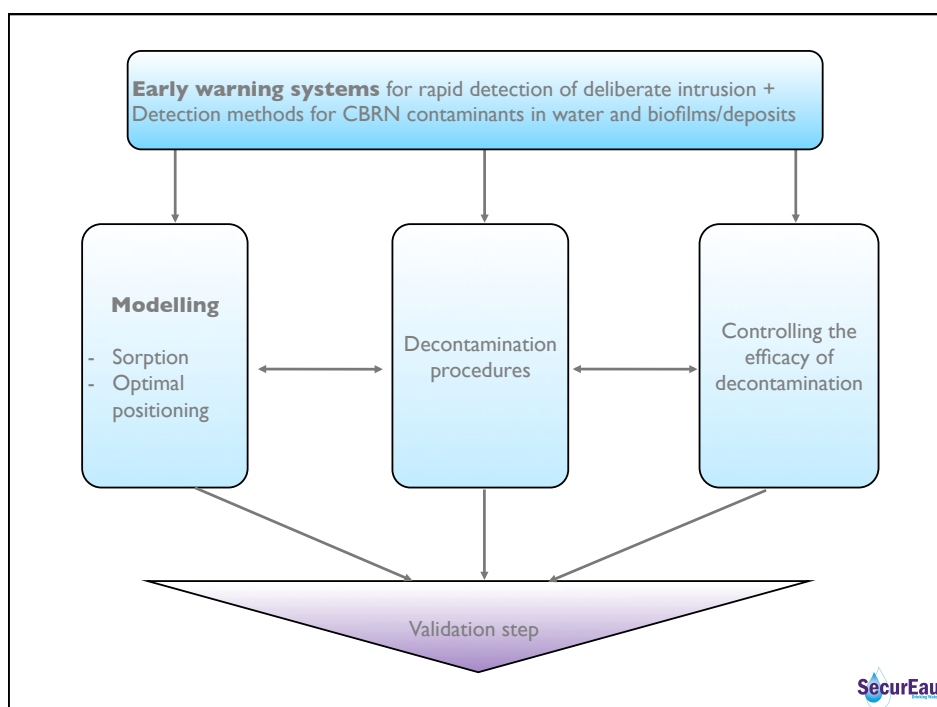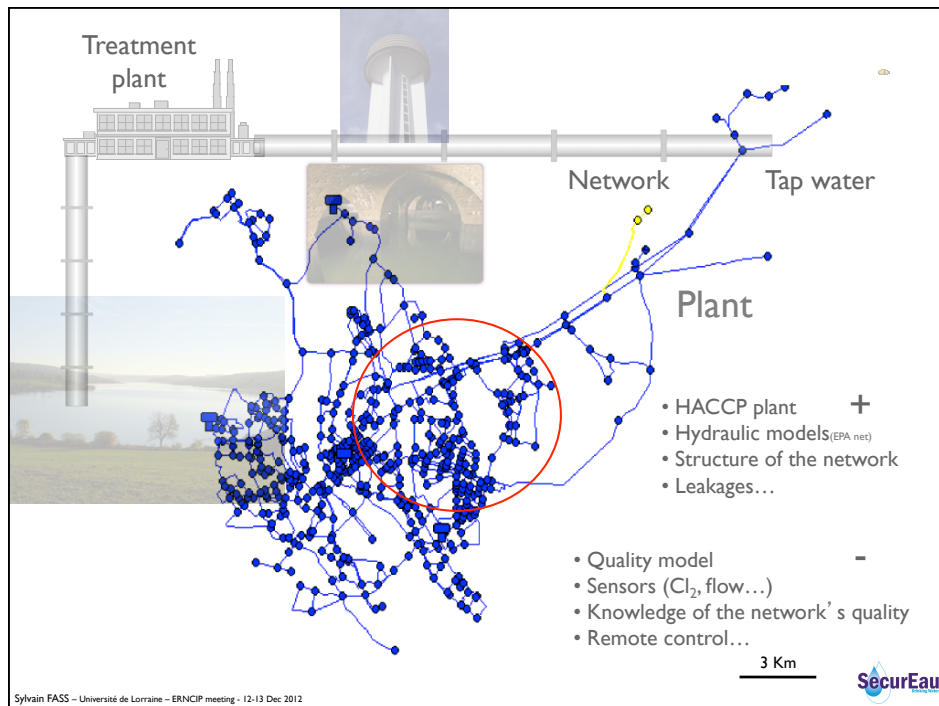# SecurEau
Drinking Water

Grant agreement n°217976

Security and decontamination of drinking water distribution systems following a **deliberate** contamination
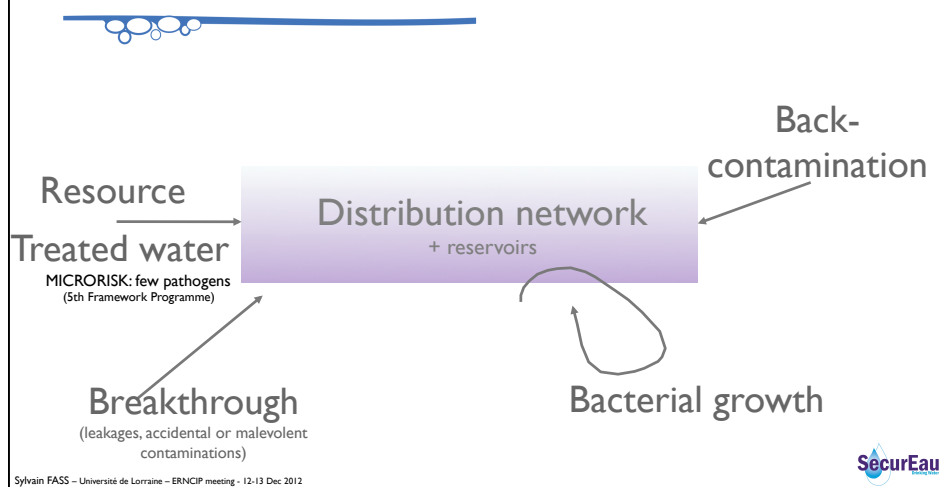
4 years, 6 countries, 14 partners -

Sylvain FASS, Université de Lorraine, Nancy, France

http://www.secureau.eu

Early warning systems for rapid detection of deliberate intrusion + Detection methods for CBRN contaminants in water and biofilms/deposits

Modelling

- Sorption
- Optimal positioning

Decontamination procedures

Controlling the efficacy of decontamination

Validation step

SecurEau

Treatment plant

Network   Tap water

Plant

• HACCP plant   **+**
• Hydraulic models(EPA net)
• Structure of the network
• Leakages…

• Quality model   **-**
• Sensors (Cl$_2$, flow…)
• Knowledge of the network's quality
• Remote control…

3 Km

SecurEau

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Vulnerabilities of the network

Back-contamination

Resource

Distribution network
+ reservoirs

Treated water

MICRORISK: few pathogens
(5th Framework Programme)

Breakthrough
(leakages, accidental or malevolent
contaminations)

Bacterial growth

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Some SecurEau answers

- New sensors
    - RN specific and non specific sensors
    - Biofilm sensors
- Sentinel coupons
- Mathematical modelling
    - Optimal sensors positioning
    - Optimal sentinel coupons positioning

- Multi-parameter sensors
- RN specific sensors
- Sanitary conformity agreement
- Autonomy (1 year)
- Fully wireless (batteries and communication)

- Commercial products
- Remote calibration
- Easy to install without stopping the water distribution

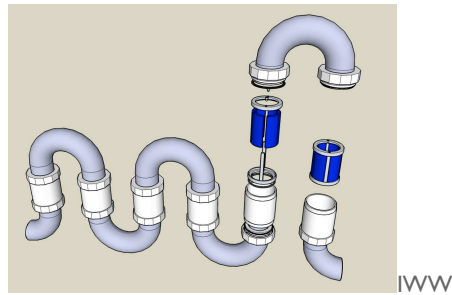Early detection of any abnormal change of the water quality

Sensor positioning
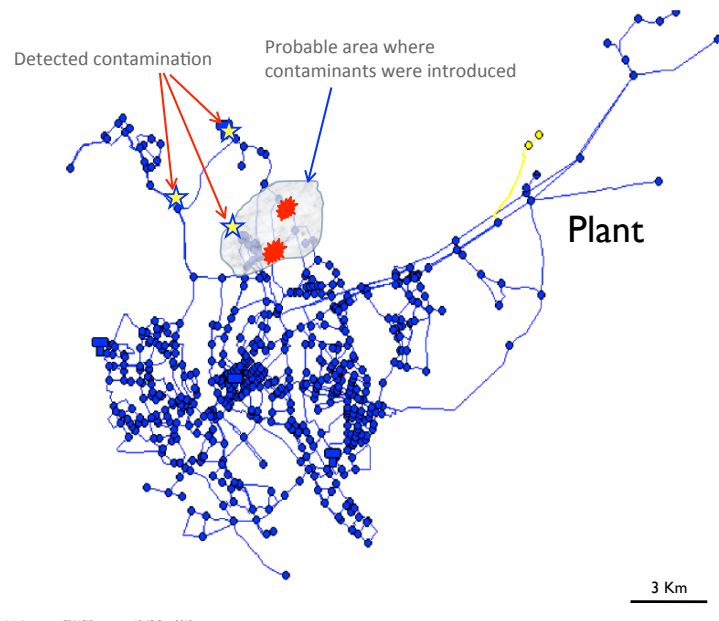
60 first sensors
criterion: detection time

16938_200s_8crit time
+ [RANK]<11
+ 10<[RANK]<21
+ 20<[RANK]<31
+ 30<[RANK]<41
+ 40<[RANK]<51
+ 50<[RANK]<61

- 60 sensors

- If contamination :

  - Average time for detection: 3.5 h
  - 1.5 ‰ volume not detected
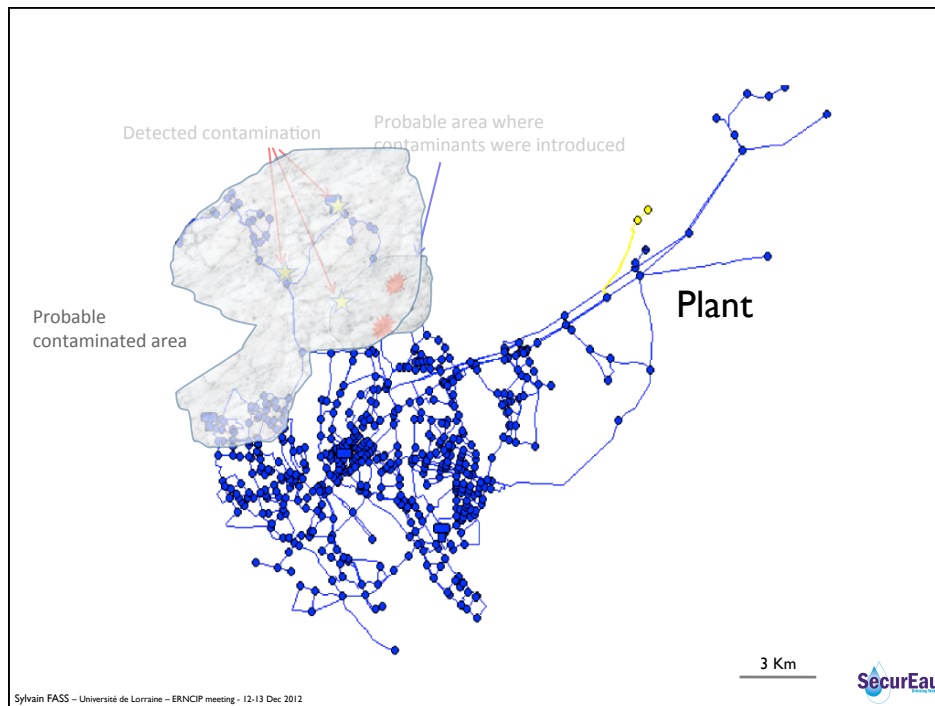 - 3‰ population in danger
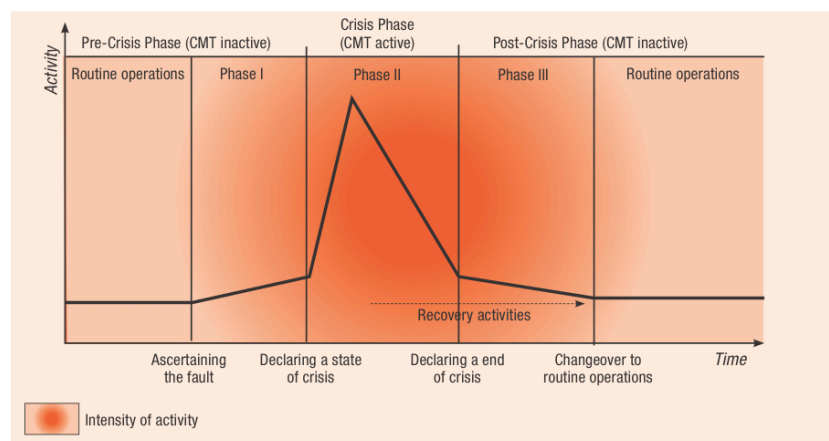
Sentinel coupons

IWW

To be installed proactively

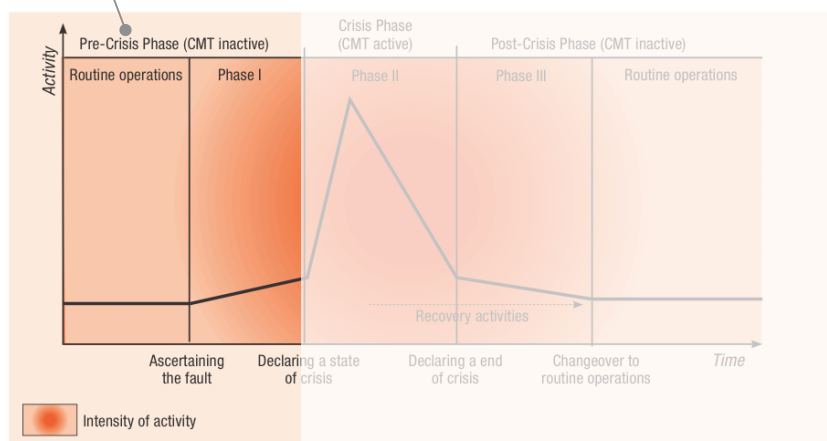Sylvain FASS – Université de Lorraine - ERNCIP meeting - 12-13 Dec 2012

Detected contamination

Probable area where
contaminants were introduced

Plant

3 Km

SecurEau

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Detected contamination

Probable area where
contaminants were introduced

Probable
contaminated area

Plant

3 Km

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Crisis management (ISO 11830)

Activity

Pre-Crisis Phase (CMT inactive)

Crisis Phase
(CMT active)

Post-Crisis Phase (CMT inactive)

| Routine operations | Phase I | Phase II | Phase III | Routine operations |

Recovery activities

Ascertaining
the fault

Declaring a state
of crisis

Declaring a end
of crisis

Changeover to
routine operations

Time

Intensity of activity

SecurEau

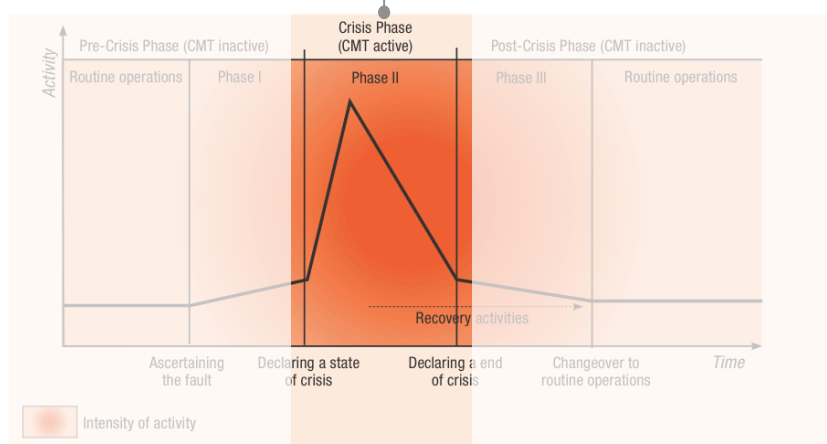Sylvain FASS – Université de Lorraine – ERNCIP meeting - 12-13 Dec 2012

Earlier detection of any « abnormal event »
(developing **sensors**, optimal **positioning**…)

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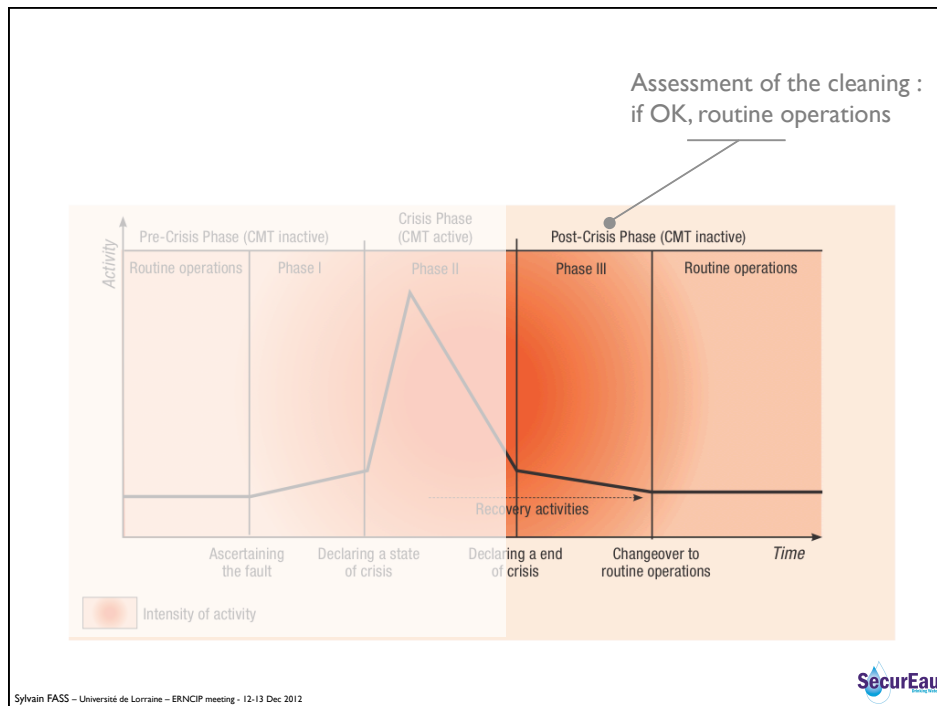
SecurEau

Definition of the contaminated zone
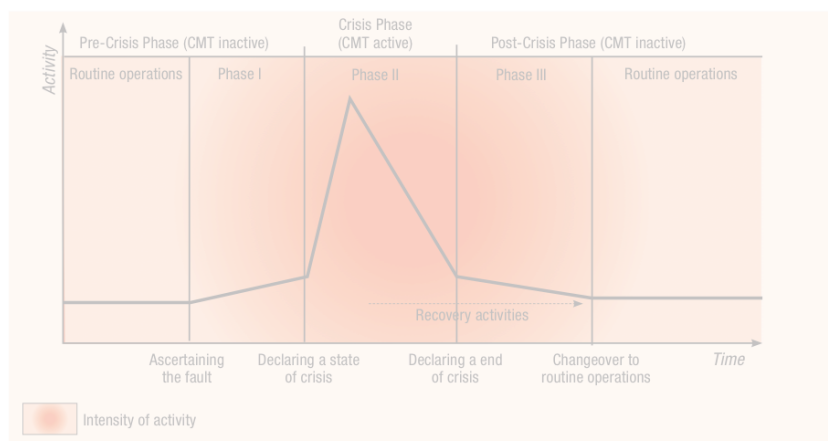Determination of the contamination source
Analyses
Decontamination techniques

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SecurEau

7

Most of data obtained and solutions to problems are applicable to everyday life of practitioners, not just for an attack

Conclusion

- Ways to identify the change of water quality immediately (sensors)

- Ways to validate these sensors (implementation in European cities)

- Technical criteria of sensors checked and validated

- Elaboration of « *Methodological guide for end users* »

- Most of data obtained and solutions to problems are applicable to **everyday life of practitioners**, not just for an attack

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