QUESTIONS TO PROJECTS AND PARTNERS:

- Will you/your partners be interested in participating and take part in a first meeting end November in Brussels?

Sharing knowledge and dissemination:

- Which are the domains of characterization research and innovation (common interests in on-going research and development), where coordination activities could be improved at European level?

- How could more Europe-wide activities lead to better sharing of know-how generated by EU-funded projects and of common interests in on-going research and development?

- Which are the latest technological developments that could significantly improve your developed instruments and sensors?

- Which innovations are most needed in the instrumentation, metrology and sensor domain?

Exploitation:

- Which are the application sectors, where the instruments and sensors developed in your project could be potentially used? In which sectors do you not have sufficient contacts to concerned end-users (e.g. for specification of requirements)?

- How could a cluster, and eventual EC support, generate higher impact of results of your project (e.g. contact to enterprises, regulation or standardization bodies)?

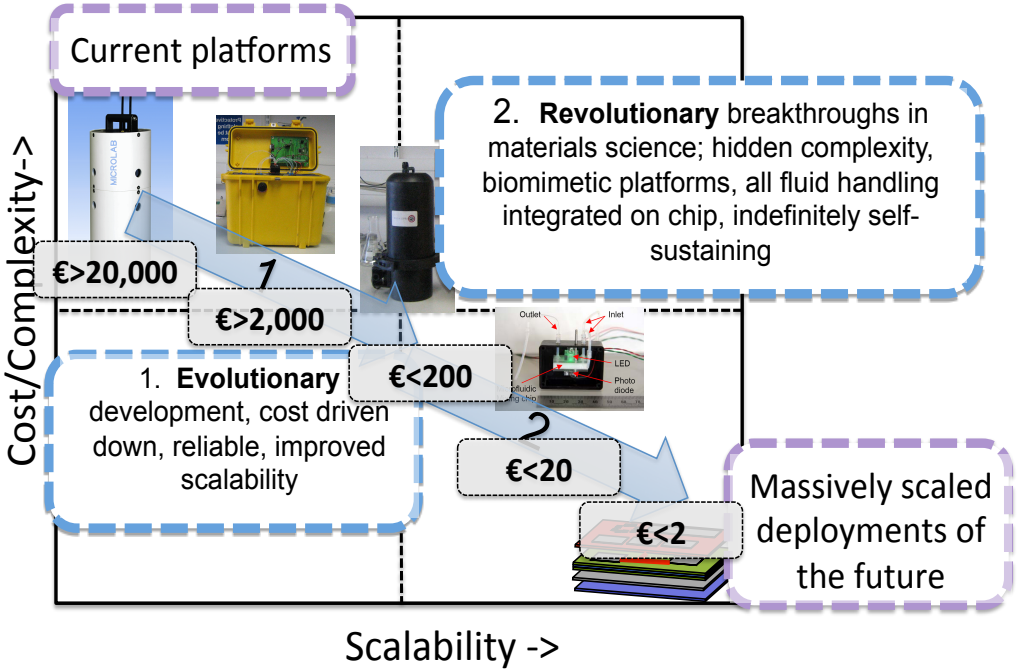
- Which financial tools or incentives would you consider as most effective for research and innovation of new sensors and instruments where should the current situation be improved?

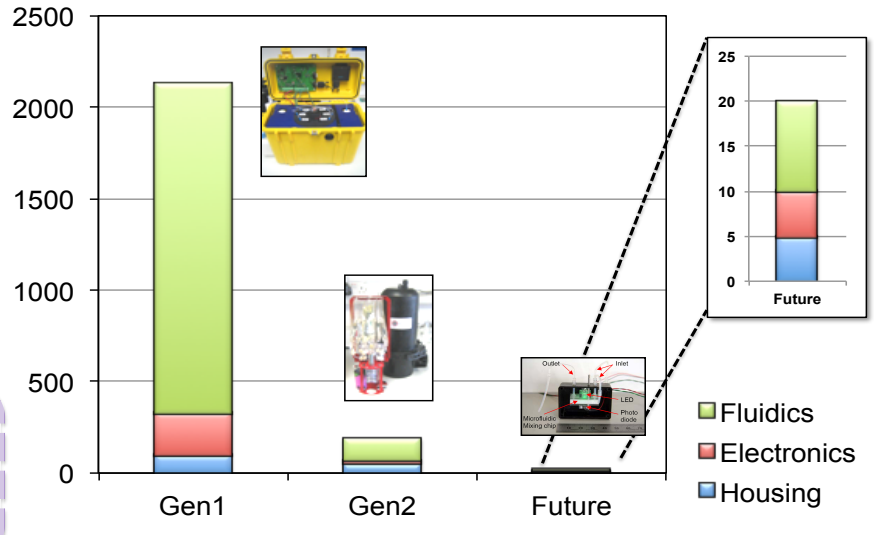
- How could pan-European value chains be strengthened for more efficient sensor and instrument exploitation and commercialization?

Conclusion:

- What should be the outcome and actions decided after the 27 November cluster meeting

Our Challenge: How to significantly drive down the cost of doing Autonomous Sensing of Key Environmental Targets

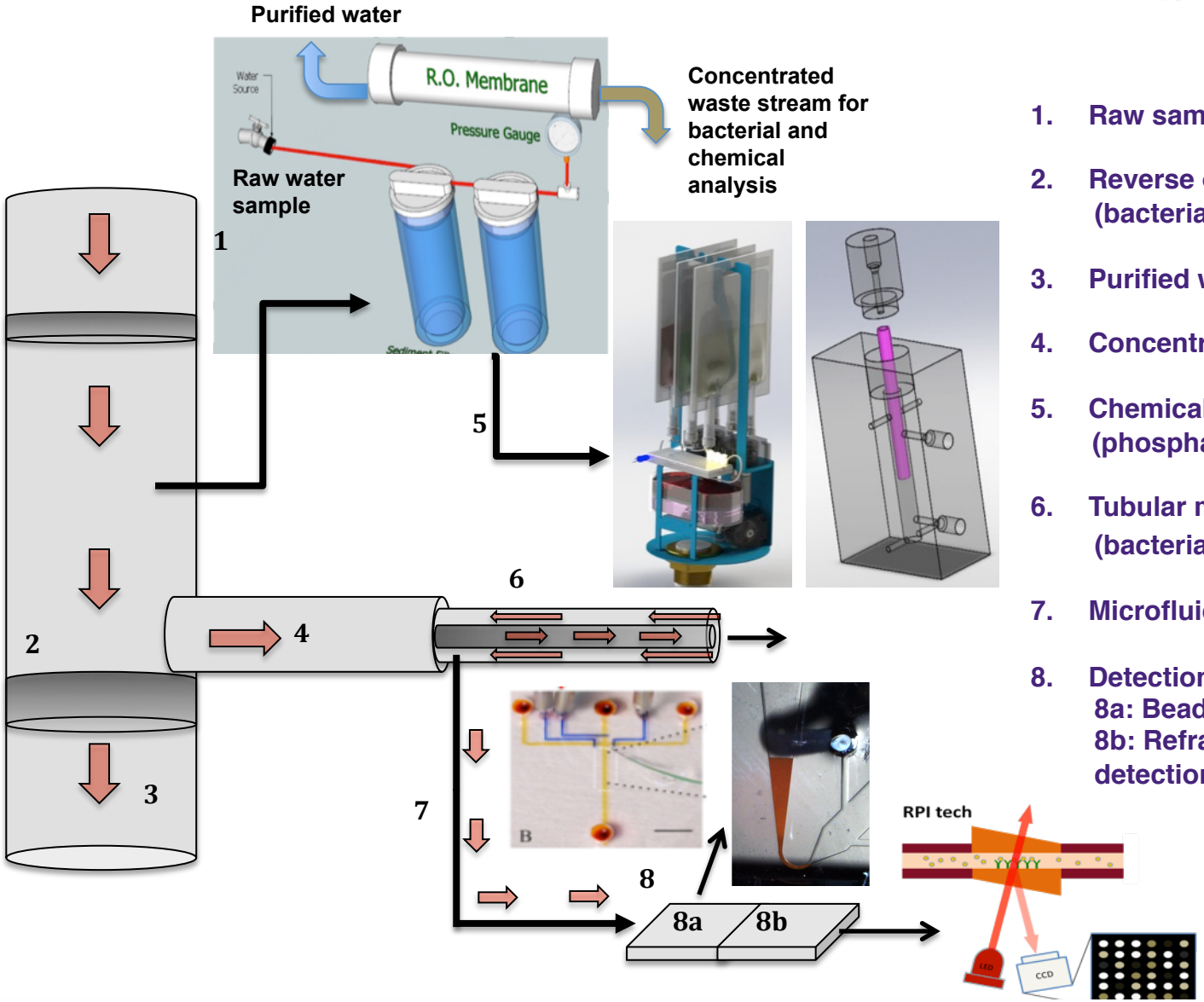




- **Unit costs, reliability, remote calibration, stability of standards and reagents, service interval, fluidics…**

NAPES Platform

NAPES
NEXT GENERATION ANALYTICAL PLATFORMS FOR ENVIRONMENTAL SENSING



1. Raw sample pre-filtration
2. Reverse osmosis (bacterial/chemical concentration)
3. Purified water stream (water source)
4. Concentrated sample stream
5. Chemical analysis of sample (phosphate, nitrate, nitrite, pH)
6. Tubular membrane filtration (bacterial concentration)
7. Microfluidic sample extract
8. Detection platforms;
   8a: Bead based bacterial capture
   8b: Refractive index based detection

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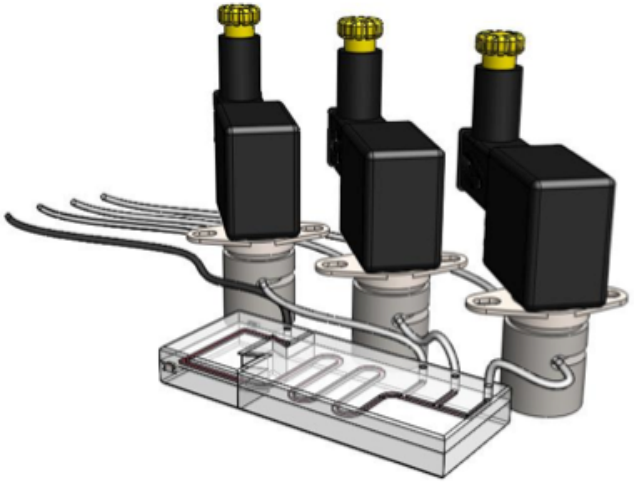
SEVENTH FRAMEWORK PROGRAMME

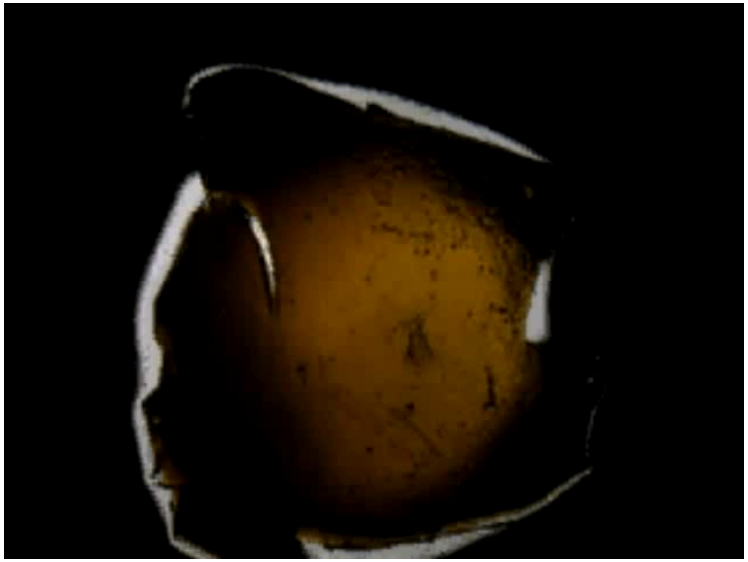
How to advance fluid handling in LOC platforms: re-invent valves (and pumps)!

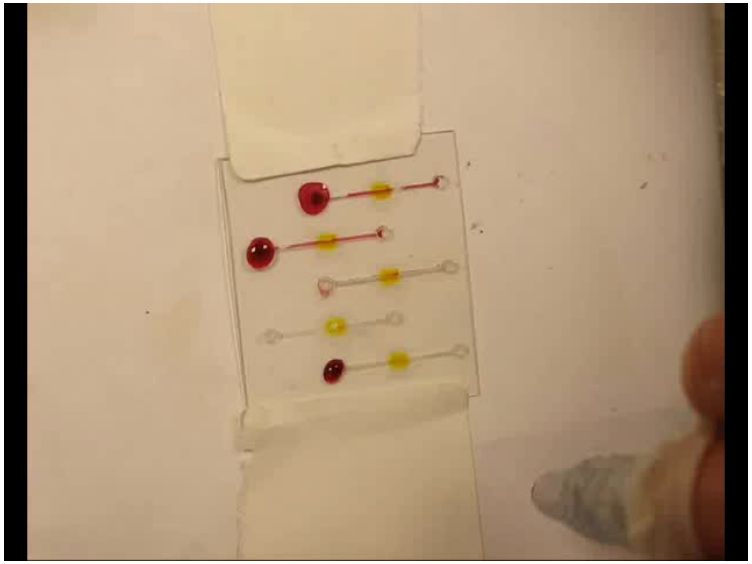
- **Conventional valves cannot be easily scaled down - Located off chip: fluidic interconnects required**
  - Complex fabrication
  - Increased dead volume
  - Mixing effects
- **Based on solenoid action**
  - Large power demand
  - Expensive

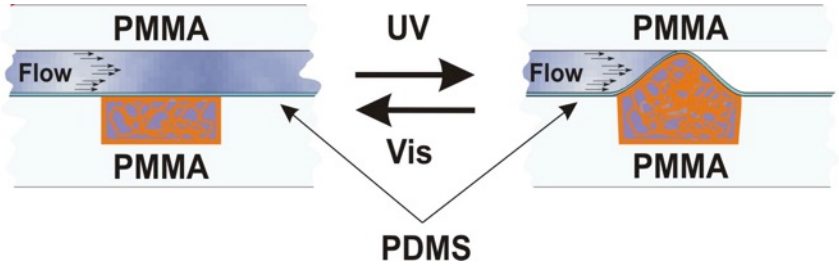


Solution: soft-polymer (biomimetic) valves fully integrated into the fluidic system

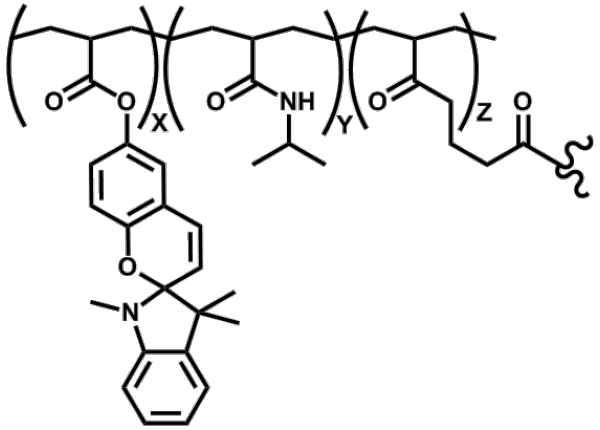
Photo-actuator polymers as microvalves in microfluidic systems

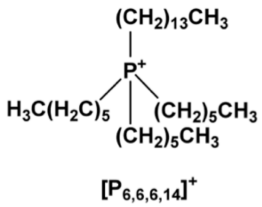


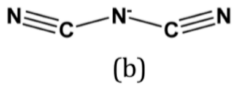




trihexyltetradecylphosphonium dicyanoamide $[P_{6,6,6,14}]^+[dca]^-$

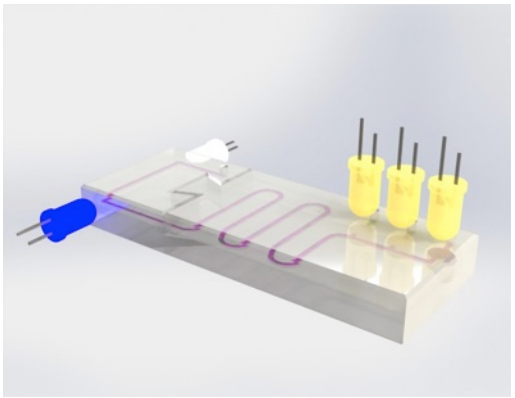


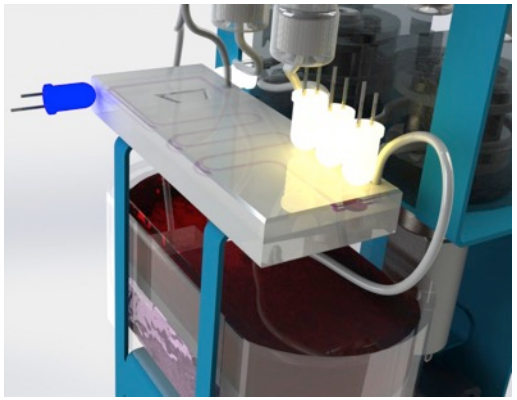


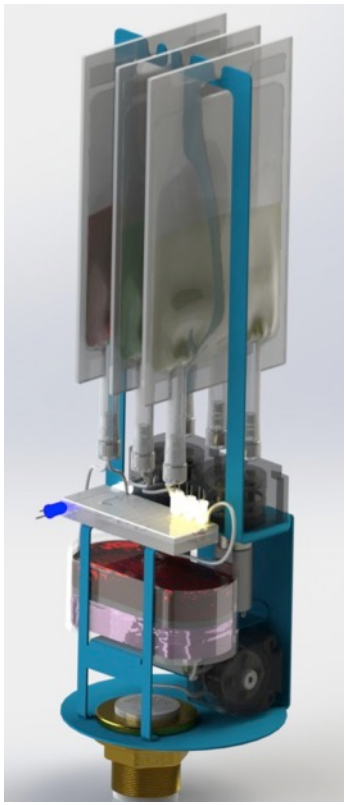


Ionogel-based light-actuated valves for controlling liquid flow in micro-fluidic manifolds, Fernando Benito-Lopez, Robert Byrne, Ana Maria Raduta, Nihal Engin Vrana, Garrett McGuinness, Dermot Diamond, Lab Chip, 10 (2010) 195-201.

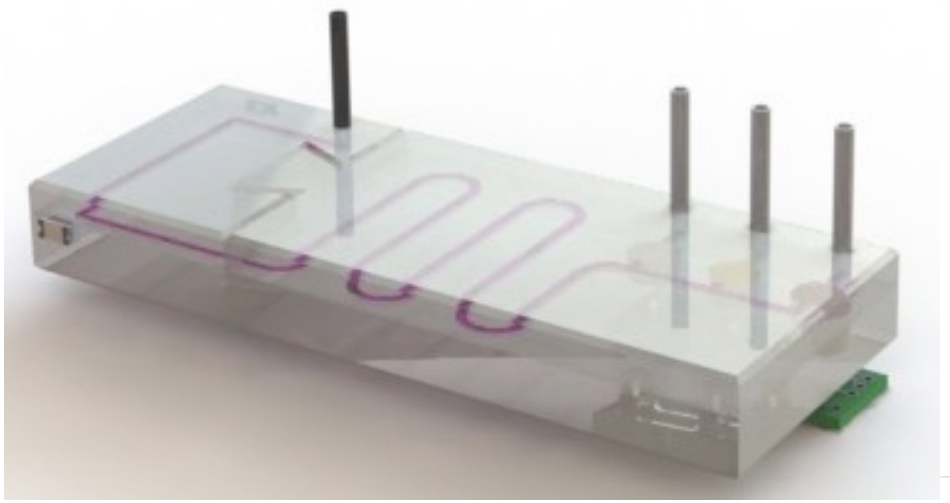
To Photo-Fluidics & Detection

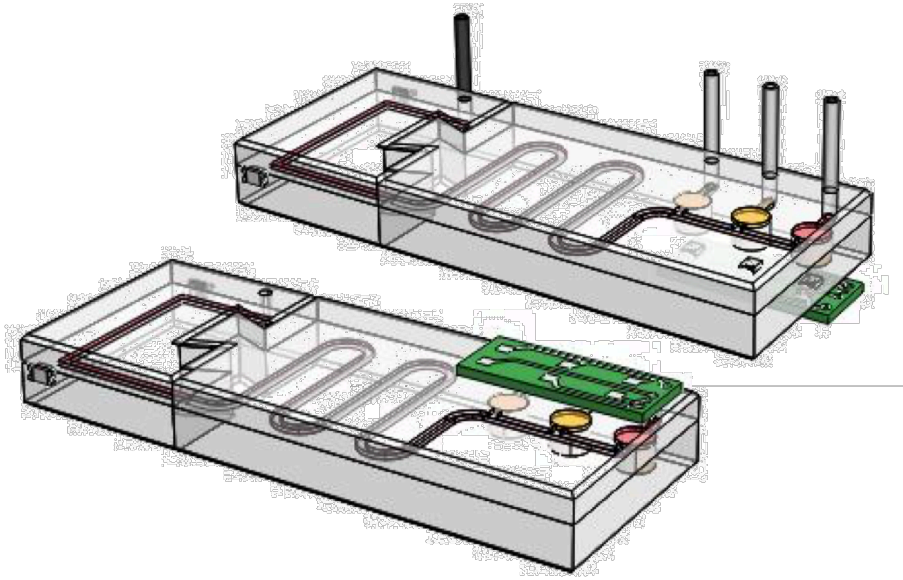






Fluidic Chip is completely sealed – no need for interconnects to detection/flow components





- Fluidic handling completely integrated into the microfluidic chip
- Valve structures created post chip fabrication by in-situ photopolymerisation
- Valves actuated remotely using light (LEDs)
- Detection is via LED colorimetric/fluoescence measurements

Moving Forward….

- Projects currently end too far from a real service or validated platform
- Productisation risk is too high – SMEs can't exploit the technology, Multinationals not interested
- Harness the power of emerging additive fabrication technologies to integrate materials research, microfluidics, product design, prototype optimisation
- Integrate measures to support medium scale deployments of emerging technologies in real scenarios (hundreds of units)
- Ensure there is good alignment between fundamental and applied research, and further integration through to platform/service development and validation