



LOW-COST INNOVATIVE TECHNOLOGY FOR WATER QUALITY MONITORING AND WATER RESOURCES MANAGEMENT FOR URBAN AND RURAL WATER SYSTEMS IN INDIA

Technology transfer and capacity building to support water quality management and water resources management in India

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The LOTUS project

- **Objective:** Co-creation of innovative low-cost technology for India's water challenges
- **The LOTUS core solutions:**
- **Use cases:**
 - Drinkwater system management
 - Irrigation system management
 - Tanker-based water distribution system



Sensor chip



The LOTUS sensor



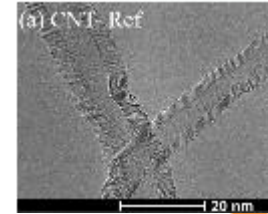
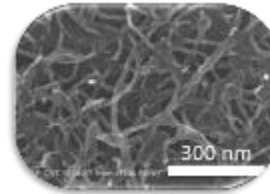
The LOTUS Box

The principle: Integration of carbon nanotube chemistor array

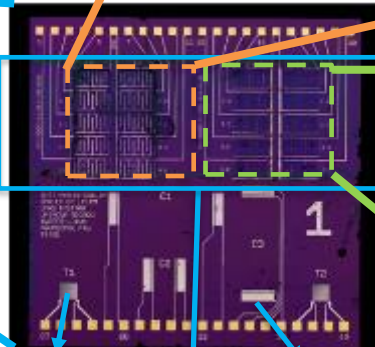


Sensor head

Non functionalized Carbon nanotube network



1 cm²
sensor
chip

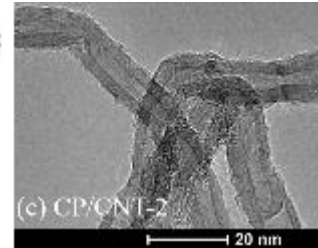
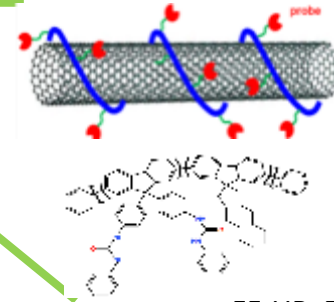


Temperature

Conductivity

pH and chlorine sensors

20 (4x5) independent devices – 2 types of carbon nanotube inks



FF-UR Functionalized
Carbon nanotube network

The LOTUS sensor meets the Indian market

- **Requirements for India:**

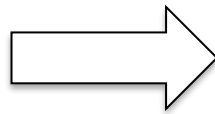
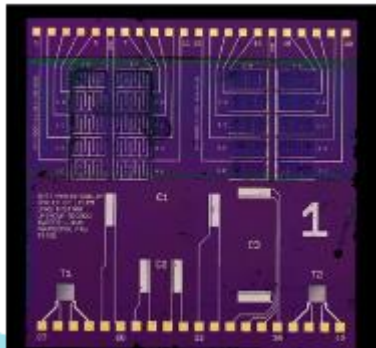
- **Multiparameter:**

- Chlorine, pH, conductivity as priority targets
 - Arsenic as critical second stage target

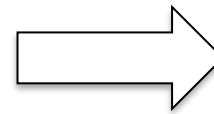
- **Extremely low cost solution : ~100 € range**

- 10 x less than European market

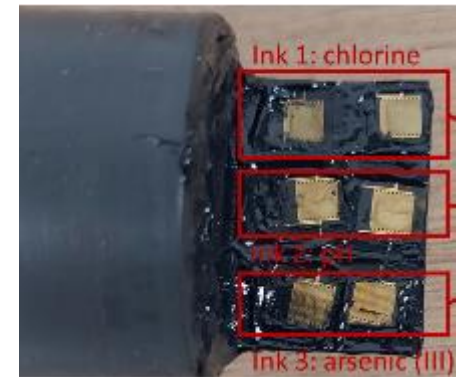
>10€/cm²



<1€/cm²



2nd version prototypes
(preseries by July 2023)



- **Challenge**

- Lotus 1st version designed based on EU market

- **Solution: Lotus 2nd version**

- From Silicon to Plastics-based sensor chip

LOTUS sensor commercialization with Hydroscope

- Creation of an EU – Indian start-up, Hydroscope Technology Pvt Ltd
 - To commercialize the LOTUS sensor in India (and beyond)
 - **A direct outcome of LOTUS**
 - Spin-off of two universities and a private company: Uni Eiffel (Paris, France), IITG (Guwahati, Assam), Pyrotech Workforce (Udaipur, Rajasthan)
- Creation of the chain of values around Hydroscope
 - Partnership with French company for industrialization of sensor chip production
 - Partnership with Indian companies for electronics and system integration
 - Multiple client testing to start by Q3 2023
- Volumes
 - Pre series: 100 units for Q4 2023 for client testing and certification process
 - Reaching 10 000 units by Q4 2024

Training of field service workers for managing water for irrigation

- Algorithm for efficient management of irrigation water for an onion crop
 - Targeting local field workers
 - Developed by TU Dortmund
- Local field workers trained to:
 - use the algorithm daily on their mobile phone
 - follow recommendations on water quantity
- Very good results
 - no crop damaged
 - significant amounts of water saved compared to usual methods of these farmers.



Training Indian labor to use the water treatment units

- AUTARCON installed its water treatment unit at the IIT Guwahati, in India and provided training to the local unexperienced labor to be able to install, operate and repair it.



Training Indian labor to use the water treatment units

- These trainings involve:
 - System installation including Drilling, sawing, screwing etc.
 - Piping, plumbing and pumping
 - Solar Power Supply systems
 - Data monitoring systems
 - Water quality analysis



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