

INTRODUCTION

This document will showcase **four** Imagine H₂O Asia companies with smart water technologies that address **water security and resiliency challenges in Asia-Pacific**.



INDIA

Fluid Robotics' AI-based SaaS solution automates pipeline inspections to significantly improve productivity for utilities, contractors and EPCs.



CANADA

Sentry's bio-electrode sensor and real-time monitoring platform provides actionable information to optimize processes for water and wastewater facilities.



SINGAPORE

EnvironSens' IOT-enabled water toxicity sensor detects heavy metals and other contaminants in real-time in water bodies and sewer networks.



SINGAPORE

SpaceAge Lab's low-power, fast-to-deploy wireless technology enables cost-effective monitoring and maintenance of remote water assets.

FLUID ROBOTICS

COMPANY PROFILE

IMAGINE H_2O // ASIA



AI-based SaaS solution that automates pipeline inspections to significantly improve productivity for utilities, contractors and EPCs



INNOVATION THEME

Network Management & Leak Detection



HEADQUARTERS

Pune, India
Santa Clara, CA, US



TARGET MARKETS

Singapore, EU, USA, India



CUSTOMERS

Utilities; Pipeline inspection contractors; EPCs, Engineers consultants



TRACTION

Deployed in 10 cities across India



IMPACT METRIC

Wastewater infrastructure contributing to over 1BLD of sanitary sewer overflows have been monitored;
> 700 MLD of wastewater treated in 10 cities collectively



Asim Bhalerao | asim@fluidrobotics.com
CEO, Fluid Robotics

IN COLLABORATION



WHAT IS THE CHALLENGE?

Wastewater infrastructure inspection technologies have become outdated globally. Almost 100% of sewers worldwide are inspected using CCTV cameras to record video inside pipes, and require camera operators that watch live videos to create inspection reports in real-time.

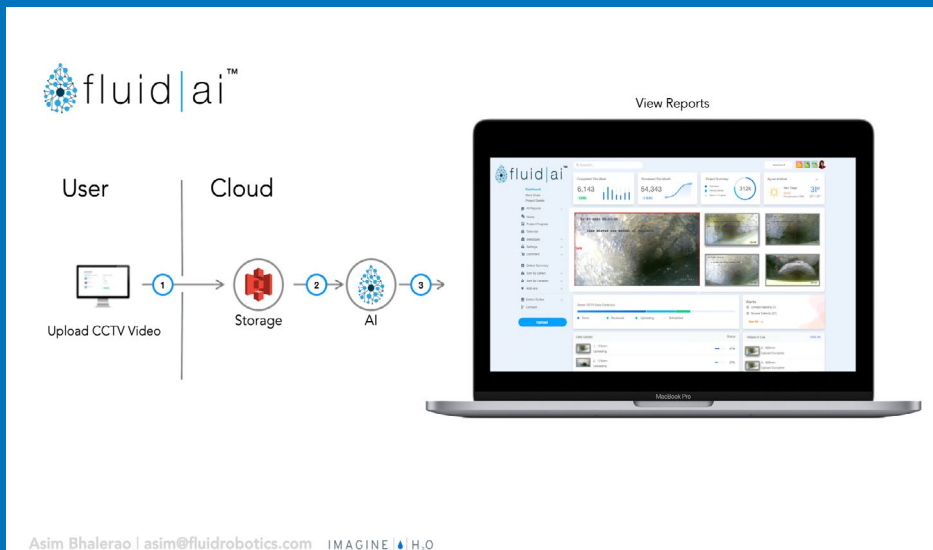
This is slow, expensive, and labour intensive, where each camera operator watches upwards of 2,000 hours of video every year. This process has a productivity of less than 50%, and yet upwards of 18 billion feet of sewers are inspected worldwide like this.

WHAT IS THE SOLUTION?

FluidAI, a machine learning and computer vision based software-as-a-service, identifies, labels and tracks the severity of pipeline defects. The defect coding systems are based on internationally accepted WRC and NASSCO standards. This frees up the CCTV camera operator from defect labeling, and enables them to focus on improving daily productivity.

HOW DOES IT WORK?

Utilities and pipeline inspection contractors directly upload sewer inspection videos to the FluidAI cloud-based platform, where the videos are analyzed and inspection reports are generated in the required formats. These reports can be downloaded and shared for reference, and the appropriate repair or rehabilitation actions can be taken.



TARGET APPLICATIONS

Municipal sewer condition assessment

KEY VALUE PROPOSITIONS

2x productivity of pipeline inspection operators;
Standardized inspections; Up to 50% cost reduction

CASE STUDY

CLIENT'S PROBLEM STATEMENT

A leading water utility in South America was struggling to efficiently inspect the city's aging sewer infrastructure, which was also in immediate need of rehabilitation. In some cases, sewers older than 40 years were being inspected for the first time. The camera operators were spending upwards of 60% of their daily shift manually labeling defects due to the complex nature of the conditions inside these old sewers. They needed to significantly increase daily inspection lengths with the limited number of CCTV cameras at their disposal if they were to reach their monthly rehabilitation targets. These were requirements driven by their environmental sustainability goals.

PROJECT OBJECTIVES

The goal was to double their daily CCTV inspection lengths of 200m per camera, so the rehabilitation crews on standby could be immediately put to work.

WHAT WAS DEPLOYED

The FluidAI cloud-based SaaS solution was deployed for each of the client's camera feeds to maximize daily inspections.



Machine Learning and Computer Vision for Defect Labeling

2X
Productivity

STANDARDIZE
Inspections

50%
Cost Reduction



KEY OUTCOMES

Helped the customer exceed their daily inspection lengths of 2x, therefore rehabilitation crews could be deployed twice as fast



TANGIBLE IMPACT

Critical defects that could result in road cave-ins could be resolved faster



RELEVANT CUSTOMERS

Utilities, Pipeline Inspection Contractors, EPCs

EnvironSens

IOT-enabled water toxicity sensor for real-time warning detection in water bodies and sewer networks



INNOVATION THEME

Sensors and Diagnostics



HEADQUARTERS

Singapore



TARGET MARKETS

Singapore, Southeast Asia, China, India



CUSTOMERS

Water and Wastewater Treatment Plants, Pumping Stations, Sewage Networks



TRACTION

>100+ deployments around Singapore with PUB;
Ongoing discussions with industrial customers in Vietnam targeting pesticides and other contaminants in agricultural runoff



IMPACT METRIC

CAPEX and OPEX savings from energy and operating efficiency; Number of toxic discharge cases identified



Shailesh Kharkwal | shailesh@environsens.com
CEO, EnvironSens

IN COLLABORATION



SOLUTION FAQ

WHAT IS THE CHALLENGE?

Wastewater treatment plants face limitations in early detection of existing heavy metals in water. Current methods of toxicant detection include bioassay indicators and chemical analysis, which suffer from inaccuracy, lack of real-time analysis, and are costly. Results from bioassay indicators, for example, could be from cumulative effects of toxicants and are not reported in real-time. There are also difficulties in maintaining and storing organisms. Other methods include chemical analysis (AAS and ICP-MS), which require expertise in preparation and analysis and are often very expensive.

Utilities, however, need early warning systems to monitor illegal discharge at the source using low-cost and efficient sensors that can quickly identify the location, time, and type of discharge so that WRP operators can have more time to react appropriately.

WHAT IS THE SOLUTION?

Environsens has developed the Intelligent Integrated Bio Sensor (I2BioS), an online and continuous monitoring system of heavy metal toxicity in water bodies and sewer networks. The solution has easy operations, accurate detection of toxic chemicals from 1-500ppm, and a fast response time through their 24/7 AI-enabled dashboard.

HOW DOES IT WORK?

The effluent water from discharge point flows to reach the I2BioS, where the microbial electrochemical sensor cells generate an output signal to be recorded every minute. There is real-time analysis of voltage output of microbial electrochemical sensor cells by an embedded dynamic algorithm in microcontrollers, and the presence of toxicity is observed based on the voltage drop determined by the embedded algorithm. The in-house autosampler (capacity of 8 samples) is triggered and an alarm is sent to the concerned authorities for toxic sample collection for validation.

The I2BioS can be installed at the last discharge point of factories, upstream of sewer networks, before WRPs, and more. Installation requirements include the availability of a power source, where solar power is an option, as well as access to the last discharge point. The system requires bi-monthly maintenance for topping up the organic source, probe calibration and cleaning. The stand-alone system of size 1000(height in mm) x 500 (diameter in mm) has an approximate weight of 35kg. The system consumes less than 350W of power. The AI-enabled IoT platform and web-based dashboard can be integrated with a central information system and be customized to measure other water quality parameters such as COD, BOD, TSS, EC, TOC, DO, nitrate, ammonia and more.



KEY VALUE PROPOSITIONS

Accurate heavy metals detection; Low maintenance required; Comes with pre-warning systems; Measurement time ranges between 5-20minutes VS up to 120minutes for conventional methods; Reduce manpower expenditure by 20-30%

CASE STUDY

CLIENT'S PROBLEM STATEMENT

Heavy metals are considered one of the most lethal toxicants, with many of them classified as human carcinogens due to their damage on human organs, even at low levels of exposure. Additionally, high concentrations of heavy metals creates setbacks in downstream biological treatment processes in water reclamation plants.

The client, PUB, Singapore's National Water Agency, was facing issues managing the illegal discharge of trade effluent in high concentrations such as:

- Long lag times between the incident and detection
- Difficulty pinpointing culprits
- Disruption to WRP's biological processes and downstream impact on production volume
- Costly and manpower heavy ad-hoc inspections

PROJECT OBJECTIVES

To protect the sewer network and NEWater plants against high concentrations of heavy metals and cyanide

WHAT WAS DEPLOYED

More than 100+ units were deployed around Singapore with PUB.



KEY OUTCOMES

More than 10 cases of illegal discharges have been detected by I2BioS in Singapore



TANGIBLE IMPACT

Reduction in 30% of manpower hours that otherwise would have been used for manual monitoring



RELEVANT CUSTOMERS

Water utilities and water treatment industries

COMPANY PROFILE



Bio-electrode real-time monitoring platform providing actionable information to optimize treatment processes for water and wastewater facilities



INNOVATION THEME

Sensors & Diagnostics



HEADQUARTERS

Charlottetown, Canada



TARGET MARKETS

Southeast Asia, Australia, and the broader Asian market



CUSTOMERS

Industrial or municipal plant operators with effluent issues caused by biological imbalance and who want to optimize a treatment process to save money, or in the case of AD, optimize biogas production



TRACTION

80+ systems globally;
90% in wastewater of which 85% are initially placed in the primary clarifier to profile incoming loads with time to act;
10% in clean water monitoring including drinking water intake, treatment performance optimization, and distribution monitoring



IMPACT METRIC

30-40% savings on aeration optimization;
\$45k-\$90k savings from lost revenue in anaerobic digestion due to early detection of performance issues;
Up to \$200k savings in drinking water by avoiding boil water advisories



Jon Grant | jgrant@sentrywatertech.com
Chief Commercial Officer, SENTRY

IN COLLABORATION



SOLUTION FAQ

WHAT IS THE CHALLENGE?

Existing tools and solutions for monitoring the performance of wastewater infrastructure are time consuming and ineffective. Manual sample analysis is not suitable for generating data sets and actionable insights. Existing real-time sensors require weekly cleaning and calibration, and are not fit-for-purpose in wastewater environments.

WHAT IS THE SOLUTION?

Sentry's technology uses a bio-electrode sensor that monitors water quality in real-time and observes biological growth in situ. Through monitoring the disinfection process continuously, the probe identifies changes as they occur, allowing operators to understand issues in real-time and make adjustments accordingly.

HOW DOES IT WORK?

Toxic shock, biological system imbalance and poor performance result in potential regulatory fines and reduced revenue at wastewater treatment facilities. SENTRY is a unique bioelectrode sensor technology that provides real-time microbial performance monitoring in anaerobic and aerobic wastewater treatment systems. Imbalances or toxic shock events can be identified the instant they begin to impact microbial activity. This allows the operator to take immediate action and reduce negative impacts on system performance.



TARGET APPLICATIONS

Wastewater Treatment; Collection Systems; Industrial Wastewater; Watershed Monitoring, Source Water Monitoring; Distribution Monitoring

KEY VALUE PROPOSITIONS

- Energy savings of up to 40% through aeration optimization
- Avoiding lost revenue when digestors sour
- Optimize biogas production and avoid lost revenue due to souring



CASE STUDY

CLIENT'S PROBLEM STATEMENT

A Wessex Water wastewater treatment facility manages a combined influent wastewater flow from municipal and industrial clients. The combination and variation of municipal and high strength industrial wastewater flows makes it difficult to maximize aeration efficiency with all BAFF cells being operated to meet peak loading events.

PROJECT OBJECTIVES

- Monitor incoming wastewater conditions and identify key biological imbalance triggers.
- Validate correlations between biological activity and organic loading to the facility.
- Develop historical data sets that show the weekly and daily biological activity trends for influent wastewater.
- Use the generated microbial activity data sets to predict low organic loading time periods and reduce aeration costs for the BAFF.

WHAT WAS DEPLOYED

Two sensors attached to one panel



TANGIBLE IMPACT

Based on the CCR readings, Wessex Water plans to divert more loading during the low organic loading periods from the BAFF reactor to the ASP. This flow re-direction will allow operators to minimize aeration requirements for the BAFF system (turning off blowers during low loading periods) and save energy. The value of this strategy will result in a saving of £50,000 -100,000 per annum with key savings in energy consumption as well as blower maintenance and cleaning.

KEY OUTCOMES

Sentry helped the client to identify the factory polluter that was causing the treatment plant disruptions with its illegal discharge. The client enacted a sewer gantry that could isolate the influent from the factory whenever the sensors picked up a toxicity event.

- In the initial 3-month period the SENTRY platform identified 21 imbalance events for biological activity.
- The weekly pattern of CCR at this site shows a wider range compared to typical municipal sites, indicating the impact industrial discharge has on the facility.
- There was a strong correlation to on-site manual BOD sample analysis and in-line COD analysis.
- Based on the findings, Wessex Water will divert more loading during the low organic loading periods from the BAFF reactor to the AS treatment system.

RELEVANT CUSTOMERS

Municipal and Industrial Wastewater Treatment Plants

COMPANY PROFILE



Low-power, fast-to-deploy wireless technologies that enable cost-effective monitoring and maintenance of remote water assets



INNOVATION THEME

Sensors & Diagnostics



HEADQUARTERS

Singapore



TARGET MARKETS

Southeast Asia, India & Australia



CUSTOMERS

Water Utilities, Decentralised Water Systems; Wastewater Management; Outdoor Facilities



TRACTION

4 ongoing projects with a large utility in SEA; Projects with notable MNCs and government agencies



IMPACT METRIC

Up to 30% savings in operating costs; Water savings through improved regulatory compliance



Leela Krishna | leelakrishna@spaceagelabs.com.sg

IN COLLABORATION



WHAT IS THE CHALLENGE?

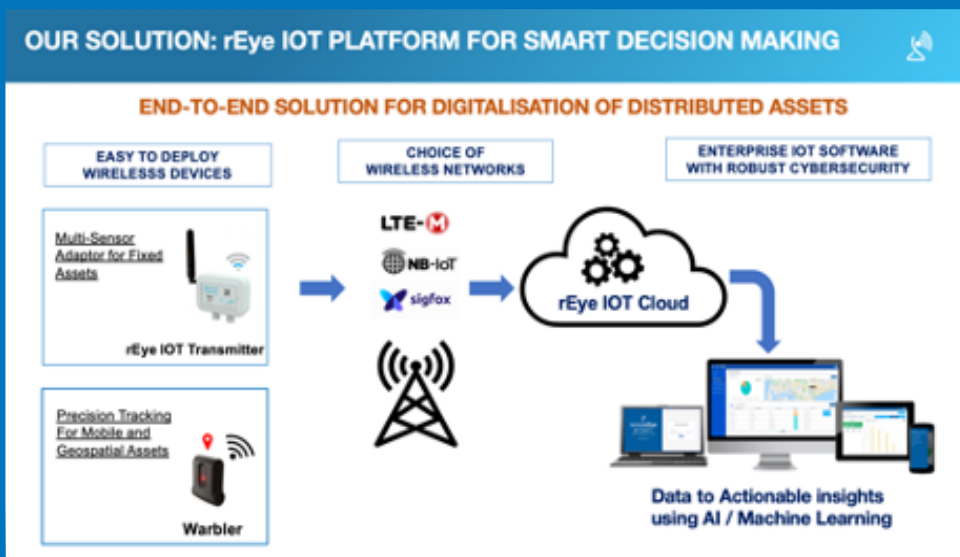
Water utility assets (such as sewer manholes, water pipelines, pump stations) are distributed and located remotely. Due to the geographic spread of such assets, managing them is often manually intensive and conducted arbitrarily due to the lack of real-time data. This leads to inefficiencies in management and operations, poor infrastructure planning, and regulatory non-compliance of discharge.

WHAT IS THE SOLUTION?

SpaceAge Labs is digitising the process of asset monitoring & maintenance of remote water assets through sensors that are connected to low-power wireless networks. These sensors are able to send updates in real-time to operators when there are changes to the system, thereby increasing operational efficiency and reducing the need for manual labour.

HOW DOES IT WORK?

SpaceAge Labs has developed a full-stack end-to-end platform (hardware + software) called remoteEye for the easy deployment of IOT solutions. The in-house designed hardware (a wireless transmitter) can connect to different types of sensors and transmits data to a proprietary cloud software using low-power wireless networks. The software, customizable to client's needs, analyses data using AI and machine learning algorithms to generate actionable insights for smart operations and management.



TARGET APPLICATIONS

Water and Wastewater Facilities

KEY VALUE PROPOSITIONS

- Up to 30% savings in operating cost
- Water savings through improved regulatory compliance
- Affordable and instantly deployable

CASE STUDY

CLIENT'S PROBLEM STATEMENT

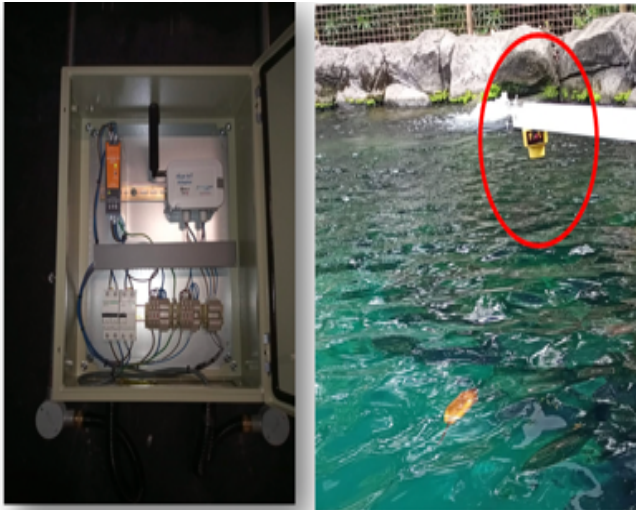
A water theme-park client had no real-time visibility on the water level status in tanks where exotic animals were hosted in. When there were abrupt changes in water levels or water leaks, the client suffered from unplanned downtime, leading to losses in revenue as well as issues in safety.

PROJECT OBJECTIVES

To install a real-time water level monitoring solution with SMS and email alerts sent to the operations staff in the case of abnormal events to take immediate corrective action, thereby minimizing operational disruptions.

WHAT WAS DEPLOYED

An end-to-end IOT solution that included level sensors, rEye IOT Wireless Transmitter, and rEye IOT Cloud dashboard & analytics for the real-time monitoring of water levels.



KEY OUTCOMES

Provided real-time data and visibility of water levels in the tanks, saving operations staff from hours of inspecting and logging the data manually.



RELEVANT CUSTOMERS

Water Utilities, Wastewater Treatment Plants, Outdoor Facilities Management



TANGIBLE IMPACT

The client is expected to save about \$50,000/yr by preventing down-time or safety incidents that normally occur from water leakages or changes in water levels. The number of manual site inspections have also been reduced, allowing workers to reallocate their time more productively.