



DRONE BASED PROCESS MONITORING— DATA WITHOUT THE TOIL

APPLICATION NOTE

BACKGROUND

Our customers frequently ask us to recommend sensors and instrumentation to monitor process variables that are critical for plant health and operational fitness. IntelliFlux Controls has often advised them about types of sensors to use, the frequency and location of measurements, maintenance requirement, and how to assess the reliability of these measurements.

To help our customers in some situations, we have recommended drone based technologies. One option that we like in major plants with large open tanks, basins, or reservoirs is a pre-programmed drone with a sensor probe that can take a regular flight path around the plant, and take measurements autonomously.

HOW IT WORKS

The concept is deviously simple, and can probably be implemented by high school students with practically off-the-shelf equipment. The programming of the system was done using our APRICOT software platform. One needs a drone (of course!) that can carry a payload of some edge computing/data transmission hardware along with a multiparameter probe (sonde) mounted on a motorized winch.

The drone can be programmed to initiate a flight at a given time from it's docking station (located on a charging station on premises, probably in a laboratory).

The drone takes a pre-programmed flight path, stopping at locations where measurements need to be made. At each measurement site, the sonde is dipped into the desired depth of the tank or basin, the data reading is recorded and sent to a database with proper spatio-temporal signatures.

Once the measurements are made, the drone flies back to the "nest" (docking station), and sets to re-charge. It can also calibrate some of the sensors and indicate when these need maintenance or cleaning.

The probe used in the drone can be any type of dipping probe, and we tend to prefer multiparameter probes. One can make colorimetric, spectroscopic, electrochemical, and other types of measurements, along with measurements of temperature and pressure.

The operator or laboratory technician does not have to go around making these measurements, and our software can even track local weather conditions and tell the system not to operate during inclement weather.

SUMMARY



APPLICATION AREA: Water Treatment

CUSTOMER: Multiple Conventional Water Treatment Operations

LOCATION: Asia, Middle-East

SYSTEM: Wastewater Treatment Basins

CAPACITY: 30,000+ CMD

OPERATED: 2020

BENEFITS: Autonomous Process Monitoring, Specifically Water/ Fluids in Large Vessels/Basins



PERFORMANCE

✓ KEY FEATURES

The system never misses recording data, is never tardy with data acquisition, and has unprecedented reach into regions that are simply too dangerous or inaccessible for operators. The system has spatial (x, y) resolution of under 20 cm, and a depth resolution of 10 cm. Indeed, we can adjust the depth of the sensor in a tank, and these can even detect surfaces of a sludge blanket in a filled and operating clarifier. The drone flight path can be programmed, with object avoidance built in. A video feed is available to monitor the flight path of the drone when it is operating.

✓ PLANT PERFORMANCE ENHANCEMENT

A do-it yourself (DIY) system of this sort can readily integrate with the **SAGE AI/ML** and **DUOs Digital Twin** combination of **APRICOT ASSIST** to provide operators context specific information and process guidance.

Imagine what this can do to your aeration efficiency assessment when your DO probe can scan different locations of your aeration basin and provide you a spatially resolved Dissolved Oxygen profile!

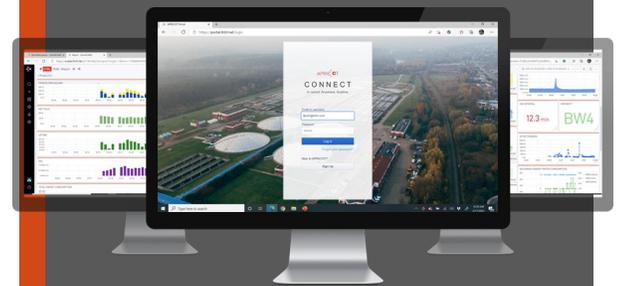
Imagine when you need to track temperature profiles in a basin, or distribution of turbidity with depth, or even track the spread of a plume!

✓ ECONOMY AND RELIABILITY

Replace many sensors with a single one that can travel and take measurements at multiple locations on its own? Well, where it works, it can reduce your sensor investment substantially. The reliability enhancement you get with a single sensor probe is remarkable. You do not have to maintain and calibrate many sensors by going to each of them individually in the field. Here is a sensor that flies back to the laboratory window ledge after every flight, and tells you if you need to clean it within the warmth of your laboratory. Give it a try. We can help you do it yourself. Automation and digital transformation can be game changing. Let IntelliFlux show you how.



Off-the-shelf hardware components with the wisdom of APRICOT can be game changing.



A platform to deliver process wisdom to adaptively operate and optimize process plants in real-time

CONNECT
ASSIST
OPERATE

A Patent Pending Tunable Combination of Digital Twin and Deep Learning



Deployed in a Client-Server Configuration



Deliverable on any Existing Plant Automation (DCS/SCADA) Platform



REIMAGINE YOUR PLANTS WITH INTELLIFLUX