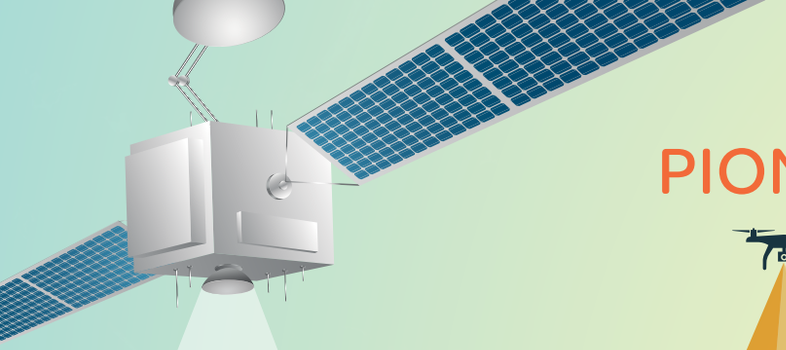
PIONEERING INNOVATIONS IN SOIL QUALITY MONITORING



Combining Drone, Satellite, Field Survey and AI to monitor soil quality is another world-first for the UAE.

1 *Satellite data is analysed to understand potential soil health hot-spots over very large regions.*

2 *Drone surveys with high resolution hyperspectral sensors are deployed to understand soil health over continuous regions.*

3 *Targeted soil samples are processed in a laboratory to verify the results found within satellite and drone data.*

4 *Artificial Intelligence (AI) / Machine Learning (ML) processes big data and assesses if area is contaminated.*

Remote Sensing Methodology

A. Satellite-Based: Satellites are used for larger areas. Sensors on satellites collect data regarding soil health, to facilitate determining the areas designated for drone surveys.

B. Ground-Based: Spectral data recorded using a handheld spectrometer. No disruption to ground soil allowing remote sensing data to be calibrated with soil samples.

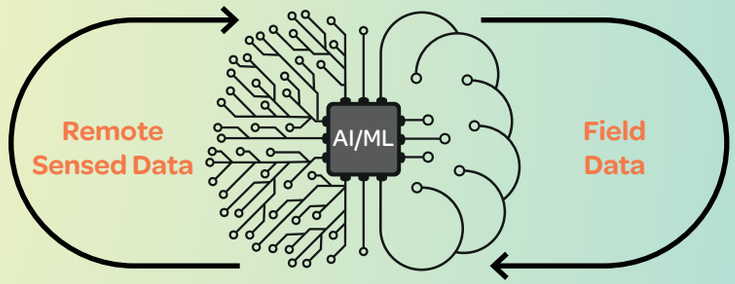
C. Aerial Drones: A drone flies over the target area several times at different heights using a highly detailed Hyperspectral Sensor. The drone is custom built in the UAE specifically for this project with a load capacity of 20 KG.

D. Soil Samples: Collected at strategic points within the remote sensing capture area. Samples are used to verify remote data.

Artificial Intelligence (AI) and Machine Learning (ML)

Innovative use of Artificial Intelligence (AI) and Machine Learning (ML) analysis is used to correlate remotely sensed data with field data. Both field data and remote sensing data is voluminous and complex to interpret. AI and ML will identify very small changes in the physical environment to provide indicators of soil health anomalies.

The algorithms that are developed will be constantly trained and improved. In the future they can be used to automatically scale up over larger areas.



Benefits:

- Produce data with confident levels of accuracy across large areas within a very short time.
- Enable EAD to identify critical areas and prioritise remediation and conservation resources.
- Introduce significant savings to conduct soil contamination analysis.

The Benefits for Abu Dhabi

- This innovative service is earmarked to go from pilot to fully deployed by the end of 2023.
- Repeatability is key. Monitoring programme methods used to continually monitor and detect changes in the soil quality of Abu Dhabi Emirate.
- Operation stage is aimed to improve and increase knowledge of soil health - particularly in fragile ecosystems such as those found within Abu Dhabi Emirate.
- Develop these frameworks and methods so that future governments can manage their countries assets through change intelligence powered by space data.
- The method is currently only used to monitor the health and quality of soil within the Abu Dhabi Emirate. Once proven successful, it can also be used to monitor other assets, such as the marine environment, water and air quality.

2023
The year of expected full deployement of Soil Quality Monitoring Programme

Future Prospects
of this innovative technology