Fuel Sensors: Innovation in fire management

Sustainable Timber Tasmania

Fuel moisture levels are important for forest managers to track and plan coup residue management practices, in particular, fuel reduction burning. The ability to access accurate and relevant forest fuel moisture content is critical to effective forest management decision-making due to the fact that moisture levels need to be within a defined range and this range needs to match appropriate weather conditions to both allow safe and productive burning of residues to maximum benefit.

OBJECTIVES

Existing fuel management practice involves the use of manual measurements and observations in the field. This system uses specially designed 'Hazard Sticks', or kiln-dried wooden sticks of an exact weight that are placed in the field to absorb moisture. The weight of the sticks are manually measured during field inspections to provide a prediction of when a site may be suitable to conduct a burn. Various sticks are installed within a given coup and the surrounding forest to give a picture of the variance of moisture levels. This process is very labour intensive, involving significant in-field time (travel and site inspections) and represents increased risk to workers due to the potentially challenging and remote terrain associated with the sites. The need, therefore, was to develop a system for remote monitoring of in-field moisture levels that increased the accuracy of moisture readings and burn window predictions and reduced monitoring costs and risk of injury for forest personnel.

DATA NEEDS

To achieve the monitoring outcomes above, the following data needs were identified:

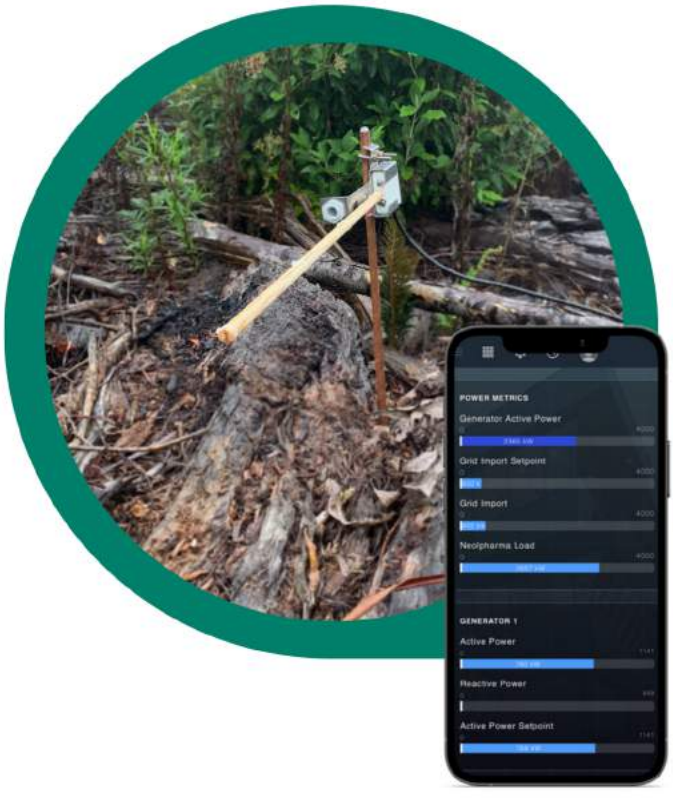
- Data needs to be highly accurate, in order to inform effective and safe decision-making
- Regular time-series data, displayed in real-time
- Users needed to be able to easily and quickly compare data from Fuel Moisture sensors, Hazard Sicks and relevant weather data

SOLUTION

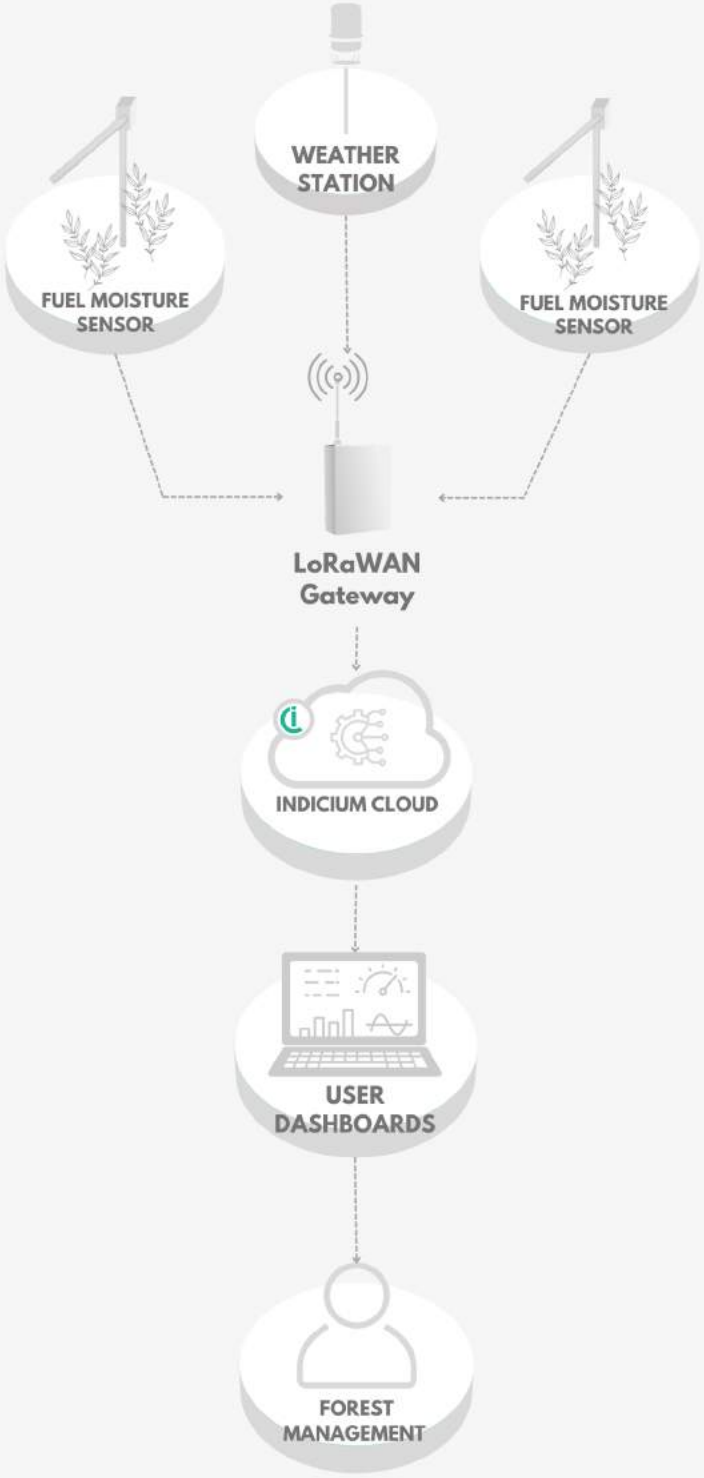
To collect this data, Indicium deployed an IoT-based Fuel Moisture Sensor. The device utilises a solar-powered remote telemetry unit connected to a Fuel Moisture Probe that communicates over Indicium's LoRaWAN network.

The Fuel Moisture Sensors were deployed alongside Hazard Sticks in order to measure the accuracy of an IoT deployment against manual methods. A weather station was also deployed nearby to collect localised environmental data.

The combined data is displayed for users on a centralised INDICIUM dashboard, which allows for customisation in the analysis and presentation of fuel moisture data.



Mike Ross
0438 233 280
Mike@indicium-dynamics.com.au
indicium.cloud



BENEFITS

- The solution reduces OH&S risks by removing the need for manual field measurements, reducing the time spent by foresters in remote and uneven terrain
- Use of Fuel Moisture Probes improve the accuracy of measurement through precision instrumentation, strengthening the ability to make effective decisions in fire management
- Data collected by the probes are integrated into the INDICIUM Platform, which provides users easy access to real-time field data. The Platform allows for the simplification of planning and execution by automating integration with associated systems and stakeholders
- Accurate assessments of fuel moisture content can help fire managers predict fire behavior and make decisions about suppression strategies, which can increase safety for firefighters and communities at risk of wildfires.

The creation of the Fuel Moisture Sensor falls within a suite of Digital Forest products developed in partnership with Sustainable Timber Tasmania (STT).

The innovative nature of these projects was recently recognised, with STT and Indicium Dynamics receiving a joint Innovation **Award in Forest Practices** at the **Forest Practices Awards 2022.**

ABOUT US

Indicium Dynamics is a full-service Internet of Things (IoT) and Data Integration solutions provider. We deliver customisable data solutions that manage the collection, analysis and display of information; supporting clients to make empowered and meaningful decisions that support business growth and success.

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Mike Ross
0438 233 280
Mike@indicium-dynamics.com.au
indicium.cloud