Woodland monitoring using LoRaWAN Sensors

As Scotland looks to increase its forest inventory to meet climate change ambitions, an opportunity exists to use LoRaWAN technology and smart sensors to capture data that will support management decisions and allow a better understanding of this resource for policy makers.

As we head towards Net Zero, the Scottish Government's Climate Change Plan outlines the need for more woodland, with £150 million in incentives being provided to support landowners in forestry creation. This will underpin the ambition to reduce emissions and sequester carbon with 18,000ha of new woodlands being created annually by 2024. Furthermore, The Woodland Carbon Code will establish a standard for the verification of carbon credits through the planting of new woodland.

Internet of Things (IoT) devices communicating over LoRaWAN have the potential to help farmers, landowners and forestry operators benefit from improved woodland monitoring, collecting much needed data to support decision making. Insights derived from sensors located within forests will help support policy makers by understanding how climate change is impacting on tree growth as well as facilitating a better understanding about our forest resources as a store of carbon.

At present, many of the measurement parameters required by forest owners and managers need to be undertaken manually. Field visits are costly, demanding significant manual effort which means that obtaining regular measurements is difficult. Using sensor technology there is an opportunity to automate a number of recording tasks, saving time, money and providing more timely and accurate data that can be used to support management efforts.

Once such innovation is LoRaWAN enabled, dendrometers can allow forest managers to monitor growth rates in their plantations without manual intervention. The principal use of dendrometers is to capture measurement attributes that can be used to derive wood volume.

Coupled with weather data from wireless weather stations and data from soil temperature and moisture sensors, valuable insights into growth response to local climatic conditions can be gleaned. Beyond capturing tree and environmental data, LoRaWAN sensors can be used to deliver other use cases within the forestry sector, including site security, lone worker safety and the tracking of machinery and other valuable assets.