Avnet Silica announces details of cooperation for 'Internet of Trees' networking solution to help prevent spread of forest fires

System based on LoRaWAN networking technology
can help alert local authorities to wildfires

Brussels, Belgium, 18th January 2022– Avnet Silica, an Avnet company (NASDAQ: AVT), today announced details of its work with an innovative start-up company that is using advanced IoT networking to help prevent the spread of forest fires across the world. Given the potential size of a forest, plus the lack of infrastructure within them, the challenge is enormous to sense the earliest stages of a wildfire.

Dryad is a Berlin-based company that has addressed the issue by developing advanced sensing nodes and highly distributed networking technology. Designed to overcome constraints such as the lack of power and connectivity in forests, its Silvanet solution consists of three pieces of hardware; proprietary RF networking that extends the reach of the low-power and low-data-rate LoRaWAN communications protocol; and a cloud analytics platform.

The first element is the solar-powered Silvanet Wildfire Sensor node, which measures standard environmental conditions including concentrations of various gases. It uses a low-power microcontroller that integrates LoRaWAN support and machine-learning processing. These devices connect to solar-powered Silvanet Mesh Gateways. Importantly, Dryad has extended the typical LoRaWAN network via proprietary technology to link the gateways and form a mesh of star networks, which together can reach deep into a forest.

These two elements create an 'Internet of Trees' that reaches the internet via the Silvanet Border Gateway, which can be placed at the edge of forest and acts as a LoRa gateway and implements 4G, or 2G/GPRS connectivity if necessary. The final element is the Silvanet Cloud Platform, which provides a complete solution for wildfire detection and monitoring. The platform can group sensor devices and gateways either by geographical area or by characteristics.

The forest environment presents an enormous challenge for implementation. For example, the system must use supercapacitors to power the sensors rather than using potentially toxic and flammable rechargeable batteries. And, in addition to the hardware, which must be produced at the lowest possible cost to enable wide deployment while also being rugged enough to ensure long operating lifetimes, also necessary is firmware development for energy-constrained data analytics, over-the-air update support, IoT security and LoRaWAN standards compliance. All this must be achieved with equipment working at low power with solar panels that are often in shade. Additionally, RF communications is a challenge as every tree is an obstruction that absorbs radio waves.

Dryad worked closely with Avnet Silica to explore its options for components that can meet these tough challenges. "Avnet Silica has been a close ally in the development of the Silvanet solution," said Carsten Brinkschulte, CEO of Dryad. "They have helped us in the selection of the right ultra-low power components, such as the sensor node MCU that integrates LoRa radio, but also has enough processing capability to analyse sensor data with enough sophistication to detect wildfires early. Additionally, Avnet has helped us to understand supply constraints for various parts, caused by supply-chain issues ranging from the pandemic through to factory fires, ensuring that we chose components available in enough volume to the rollout of sensors and gateways in significant volume."

"When you go to market and roll out your network with quantities rising, it becomes absolutely crucial to have all the microcontrollers and other parts delivered on time," said Ingo Seehagen, senior field application engineer at Avnet Silica. "We are now working with Dryad looking at potential optimizations of the designs featuring even lower-power devices and lower costs."

Dryad also believes that wildfire sensing is just the first application of its innovative IoT technology. Once a Silvanet infrastructure is in place, it could monitor other aspects of forestry such as soil

moisture, tree growth, sap flow and even illegal logging, as well as enabling air- and water-quality monitoring over large areas.

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