FlatMesh & GeoWAN Platforms

In order to provide clients with remote condition monitoring solutions in the widest range of environments, we offer two distinct communications platforms built for different applications.

FlatMesh™ is the natural choice for dense sensor configurations, high frequency reporting and intelligent, responsive operation. Our GeoWAN™ platform has a longer range of up to 15 km and is ideal where sensors are more widely dispersed.

FlatMesh™
Intelligent monitoring

- Third generation intelligent flexible mesh network monitoring platform/architecture
- Up to 300 m range (gateway to node or node to node), in optimum conditions
- Battery life of up to 15 years
- Best for dense wireless sensor node deployments
- Standard reporting rate: 10 minutes
- Fully remotely configurable
- Available with intelligent and triggered sampling rates based on real movement of sensors to minimise human intervention
- Can function as Intelligent Solution with multiple structural and geotechnical sensor types and integrated 4G cameras
- Compatible with full range of geotechnical and structural sensors
- Ideal applications: tunnels, rail trackbed, bridges, walls, piles, structures, geotechnical earthworks, and soil water content measurements

GeoWAN™
Long-range monitoring

- Long-range point to point wireless platform, ideal for challenging environments; capable of "seeing through" solid obstructions
- Up to 15 km range (gateway to node), in optimum conditions and typically 2-4 km in busier urban environments
- Battery life of up to 15 years
- Standard reporting rate: 1 hour
- Number of nodes in network will affect speed of reporting rates
- Remotely configurable, but more limited bandwidth available
- No triggered sensing from other nodes in the network
- Compatible with full range of geotechnical and structural sensors
- Ideal applications: congested urban environments, long-range applications where sensors are dispersed across wide areas, applications where communication is needed through obstructions, and sites where mains power is available

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FlatMesh™
Intelligent monitoring

The award winning FlatMesh™ platform uses a wireless mesh-networked, intelligent sensor system consisting of small, easy to deploy devices, equipped with sensing, communication and computation capabilities.

In a FlatMesh™ system the devices 'talk' to their neighbours, relaying data in a series of hops to the outside world. This dynamic, non-hierarchical system is extremely robust and can tolerate damage to individual devices without systematic loss of performance. It is suited to dense networks concentrated in relatively small areas. It is particularly appropriate for sites that are difficult to access, with obstructions that would constrain other technologies.

The FlatMesh™ platform incorporates a significant level of network intelligence, enabling not just a degree of self-configuration and self-healing, but responsiveness to events.

Features of Wireless Mesh Networking

At a technical level, FlatMesh™ has been tested and proven over a decade of deployments in highly demanding environments, and prior to that, in five years of research at University College London, one of the world's most respected engineering universities.

The proprietary communications protocol is based on the industry standard IEEE 802.15.4 PHY and MAC layers, operating in the global 2.4GHz ISM band. Deployed as part of an integrated system that can incorporate many sensor types, FlatMesh™ is ideal for complex applications such as construction sites or buildings where obstructions are common and accidental damage to parts of the wireless monitoring system is possible.

Nodes communicate to find the optimal route, transmitting data to the gateway in a series of "hops". In the event of a sensor node or gateway dropping out for any reason the other nodes

will find an alternative route; this provides a significant level of robustness and redundancy. It also enables highly flexible deployment configurations, particularly in comparison to hub and spoke wireless alternatives.

Continuous improvement to sensor interface and wireless algorithms has resulted in ultra-low power consumption and very long battery life, with many sensor nodes capable of lasting up to 15 years while taking precision samples every 30 minutes and relaying messages through the mesh.

Gateways are pre-configured so the system will function as soon as it is installed. Users can choose from connection options including USB or RS232 connection to local equipment, or connectivity via an integrated solar powered cellular gateway. Alternatively, where mains power is available, the FlatMesh system can be connected directly to other databases, data loggers or industrial PCs.

The system is highly intelligent and enables remote users to interact with nodes and the gateway, for example to re-configure the frequency of readings. Data are transmitted to our user friendly WebMonitor software, or can be sent to many widely used third party data viewing platforms. To read more about Webmonitor, please visit https://www.senceive.com/webmonitor.

FlatMesh™ users benefit from many years of technical development and experience gained in a wide range of challenging applications. With tens of thousands of sensors around the world running on FlatMesh™ technology, you can be confident that you are using a reliable system built on quality, precision and durability.

FlatMesh™ Specifications

Parameter	Value
Communication Type	**Proprietary FlatMesh™ v3 Mesh Networking Protocols IEEE 802.15.4**
Frequency Band	**2400 – 2485 MHz ISM Band**
Maximum Network Size	**Up to 100 nodes. Wireless cameras can also be incorporated**
Range between nodes, node to gateway	**Up to 300 m**

Certifications

Approved for use in most countries. Sector-specific approvals in place for a number of industries, including rail.

To find out more about FlatMesh™, please visit

https://www.senceive.com/flatmesh-geowan-platforms/flatmesh

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GeoWAN™
Long-range monitoring

Where a geotechnical or structural monitoring solution is required to cover a large area, such as a mine or a city, we would usually recommend our GeoWAN™ communication platform.

GeoWAN™ uses a lower frequency radio band than FlatMesh™. It is based on the industry-standard LoRaWAN protocol and is capable of long-range transmission with sensors able to communicate with a gateway at a distance as great as 15 km.

Monitoring systems using GeoWAN™ have the power to transmit through physical obstructions, enabling, for example, integration of sensors in boreholes or on buildings above a tunnel with movement sensors measuring deformation inside the tunnel.

From the gateway the options for getting the data to the outside world are restricted only by the available infrastructure. The simplest option in most cases is to use the gateway's integrated cellular (2G/3G/4G) modem; alternatively, the gateway's Ethernet connection may be used to enable connectivity via WiFi, ADSL or cable connections.

Applications
- Tunnels and pipelines
- Dams, mines and quarries
- Covered or obstructed assets and open areas or congested urban environments
- Buried or subsurface structures e.g. basements
- Highly dispersed asset monitoring

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Features

- Full range of wireless geotechnical/ structural sensors
- 4 km range in urban environments
- Maximum range of 15 km in optimal conditions
- Up to 15 years battery life on nodes
- Flexible gateway options
- Seamless roaming across gateways for ultimate system redundancy

GeoWAN™ Specifications

Parameter	Value
Communication Type	Star Topology
Frequency Band	863 MHz – 928 MHz ISM Band
Maximum Transmit Power	20dBm (actual transmit power depends on geography)
Range	Up to 15 km depending on the environment
Maximum Reporting Frequency	30 seconds

To find out more about GeoWAN™, please visit

https://www.senceive.com/flatmesh-geowan-platforms/geowan

Position
Partners

Shaping New Dimensions