FlatMesh™ Wireless Network

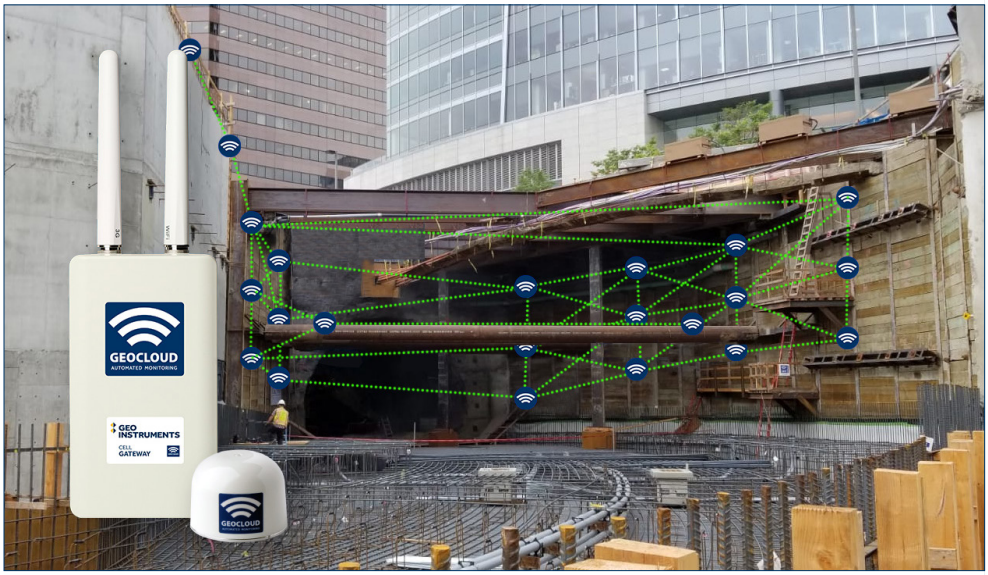
FlatMesh Node & Gateway

The FlatMesh wireless network is a data acquisition system consisting of a number of wireless nodes and an internet gateway.

Nodes obtain sensor readings, embed them in packets addressed to the gateway, and transmit them to neighboring nodes. The nearest neighbors forward the packets to the gateway or to their own nearest neighbors if the gateway is out of range.

Milliseconds later, the packets arrive at the gateway, which forwards them to an internet server via a cellular connection.

GeoCloud Services on the internet server process the readings, check for alarms, and update project websites to show current status, graphs, and reports.



Wireless mesh interface nodes transmit sensor readings from node to node to reach an internet gateway.

Nano Tiltmeter Node has built-in 3-axis tiltmeter with range of ±90° for each axis.

Tiltmeter Node has built-in 3-axis tiltmeter with range of ±90° for each axis.

Laser-Tilt Node has two built-in sensors: a laser distance meter and a 3-axis tiltmeter.

Vibrating Wire Node works with vibrating wire sensors. 1 and 4-sensor versions available.

Millivolt Node works with resistive bridge sensors.

RTD Node works with PT100 temperature sensors.

Cellular Gateway

USB Gateway

Cellular Gateway

Function: Forwards data from nodes to the internet.

Node Connectivity: 2400 – 2485 MHz, FlatMesh v3 Mesh, IEEE 802.15.4 compliant.

Internet Connectivity: Cellular UMTS/HSPA+ and quad band GSM/GPRS/EDGE.

Capacity: 100 nodes

Power Supply: 8800 mAh lithium-ion internal battery, 21 days without charging, recharging via AC or solar panel.

USB Gateway

Function: Portable gateway forwards data from nodes directly to a local PC via wired USB connection. No internet needed.

Node Connectivity: 2400 – 2485 MHz, FlatMesh v3 Mesh, IEEE 802.15.4 compliant.

USB Interface: PC Standard: USB 2.0

Device Type: Virtual COM port

Connector: USB A plug.

Cable Length: 39 inches (1 m).

Power: 5V, 500mA max from PC.

General Node Specifications

Function: Nodes obtain sensor readings at scheduled intervals and then transmit the readings immediately. Readings are not stored.

Node Connectivity: 2400 – 2485 MHz, FlatMesh v3 Mesh protocol, IEEE 802.15.4 compliant.

Max Transmit power: 6.5 dBm.

Max Antenna Gain: 2.2 dBi.

Max Range: 980 feet (300m) point to point.

Temperature Rating: -40 to +185°F (-40°C to +85°C)

Weatherproofing: IP68 at 1m for 24 hours.

Housing: Die cast Aluminum.

Vibrating Wire Interface Node

Sensor Compatibility: Vibrating wire, 200 to 6500 Hz.

Excitation: Swept sine wave, 6V peak to peak.

Resolution: 0.001 Hz.

Repeatability: ±0.02 Hz.

Temperature sensor: 3kΩ thermistor.

Temperature Resolution: 0.05°C.

Temperature Accuracy: ±0.1°C.

Capacity: 1 sensor or 4 sensors

Battery Life: 12-15 years for both 1 and 4 sensor versions, with 25 minute reporting intervals.

Tiltmeter Node

Sensor Type: MEMS tilt sensors in three axes.

Range: ±90° for each sensor

Resolution: 0.0001°.

Repeatability: ±0.0005°.

Battery life: 12 to 15 years @ 25 minute reporting.

Waterproof: IP68 at 2 meters for 24 hours.

Housings: Nano series has PVC dome. Original "triaxial" series has aluminum housing.

Laser-Tilt Node

Laser Sensor: Laser Class 2, 655 nm (visible red).

Range: 165 feet from natural surface target, 330 feet from white target, 500 feet from reflective target.

Resolution: 0.004 inch.

Repeatability: ±0.006 inch.

Tiltmeter Sensor: MEMS tilt sensors in three axes.

Range: ±90° in each axis.

Resolution: 0.0001°.

Repeatability: ±0.0005°.

Battery life: 10 years at 1 hour reporting interval, 8 years at 30 minute reporting interval,

Crackmeter Node

Excitation: 2.5V, 100mA max.

Resolution: 0.0015% of full scale.

Noise Level: 0.005% of full scale.

Capacity: 1 and 2 sensor versions.

RTD Node

Excitation: Constant current.

Range: -40 to +185°F (-40 to + 85°C).

Resolution: < 0.01°C.

Accuracy: < 0.1°C.

Capacity: 1 RTD / PT100 sensor.

Millivolt Node

Excitation: 5.0V ± 0.1V, 150mA max.

Range: ±0.625V (±125mV/V).

Resolution: 74.5nV (14.9nV/V).

Repeatability: ±2.5µV (±0.5µV/V).

Capacity: 1 sensor with thermistor.