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LET'S GET TECHNICAL

SYSTEM OVERVIEW

RF MESH RADIOS FOR INDUSTRIAL APPLICATIONS

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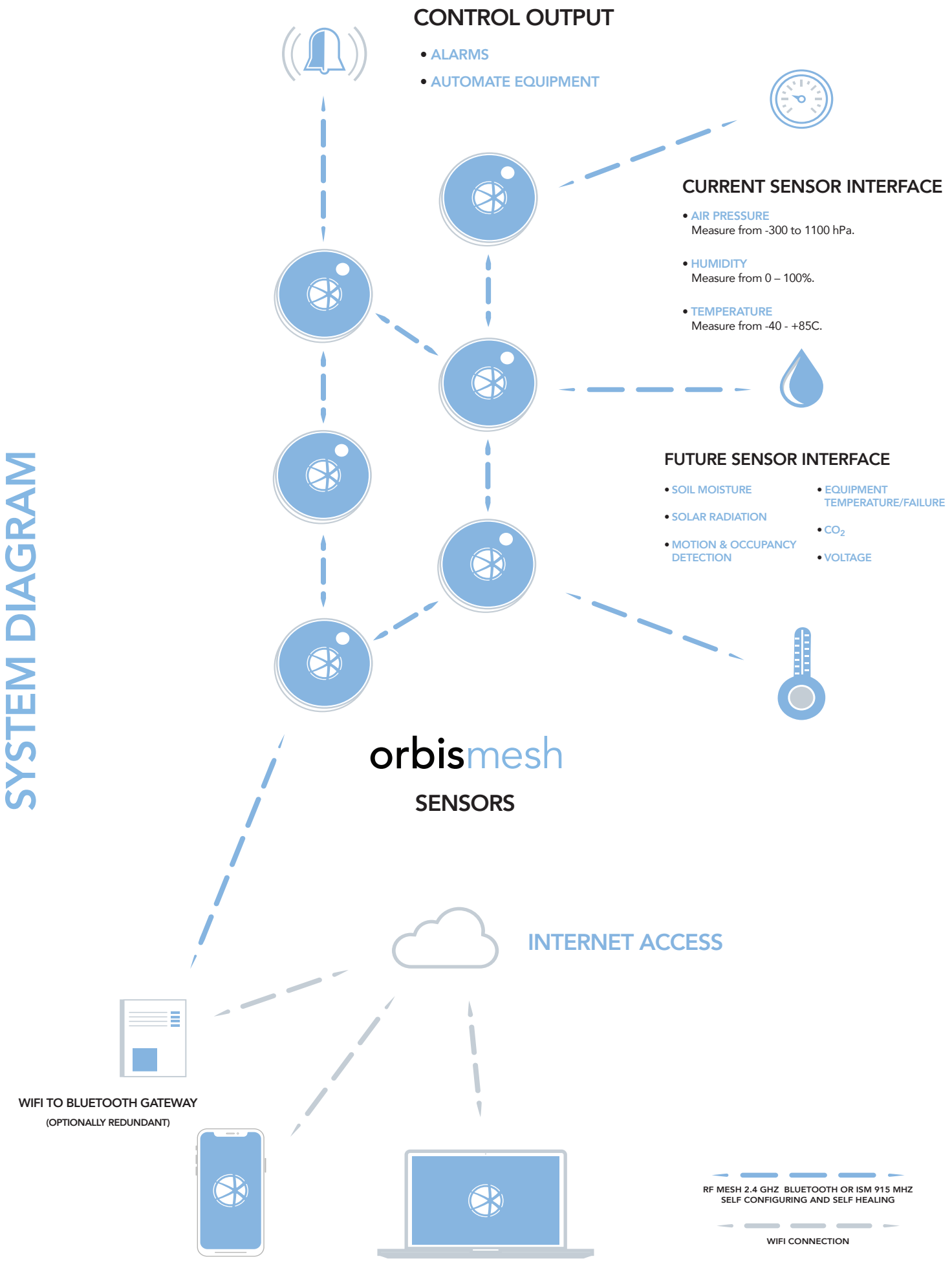
SYSTEM DIAGRAM



THE ORBIS MESH RADIO NETWORK

Orbis Mesh Technologies Inc., www.orbismesh.com a Vancouver BC, based company has developed an industrial radio sensor system based on Bluetooth Low Energy (BLE) Mesh networking technology https://www.bluetooth.com/bluetooth-technology/topology-options.

Utilizing RF Mesh networks **eliminates costly outdoor cabling, provides a redundant and self configuring / self healing mesh network**, that enables telemetry and data to be relayed back to the control center and does so using commercially available unlicensed spectrum technology.

All of which means that it is now possible to **smartly and sustainably manage your infrastructure using the Internet of Things (IoT)** in a way that was not efficient, effective or cost affordable before.

KEY BENEFITS

1) LOWER COST

- Our wireless solution is lower cost then out door cabling
- Using unlicensed Bluetooth spectrum eliminates costly cellular or satellite airtime charges
- The radio is based on the industry standard for Bluetooth Low Energy (BLE) offering a solution that is low cost, small in size and consumes low power.

2) MESH NETWORKING

- Provides a redundant network with no single point of failure
- Automatically recognizes all the other radios in the network and self configures
- In the event of a failure the network is self healing ensuring continuity of communications automatically.
- Offers a medium range of 10s – 100s of metres expanding on the short range of standard Bluetooth
- Supports unlicensed spectrum in either the Bluetooth 2.4 GHz band or the ISM 915 MHz
- All communications are securely encrypted (AES 128) via blockchain technology
- Ability to support future location positioning service

3) TRANSPARENT TELEMETRY DELIVERY

- Transparently relays sensor data or any other telemetry signals across the RF network from the radio sensor to the gateway and the control center
- Can send / receive command signals (analog or digital) to turn on/off devices
- Designed for industrial applications with a robust outdoor design
- The RF system can be fully and transparently integrated with an OEM's H/W and S/W

THE WIRELESS NODES

The Orbis Wireless Node / Sensor is a durable, light-weight, waterproof, self-contained unit. Capable of operating at either 915 MHz or 2.4 GHz it has a typical range of 40-50 meters unobstructed outdoors @ 2.4 GHz and 1 km at 915 MHz.

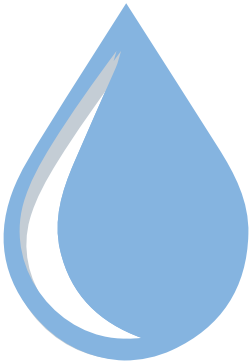
The unit is currently battery powered offering extended operation (months) and can be mounted on a small mast to raise it above plant height (for agriculture).

The first release is equipped with built in temperature, humidity and pressure sensors. The sensors have the following operational range:

Humidity: **0 – 100%**
Pressure: **300 – 1100 hPa**
Temperature: **-40 - + 85 C**

The first commercial release of the wireless sensor will support a connection port enabling any of the sensors or interfaces listed below to be supported. The unit will also be available with a solar powered option or interface to external power.

SENSOR INTERFACES SUPPORTED



The Orbis Wireless Sensor will transparently relay sensor data across the network enabling it to support / interface to a wide range of signal types. Currently supported are the following:

- TEMPERATURE
  - Measure from -40 - +85C.
- HUMIDITY
  - Measure from 0 – 100%.
- AIR PRESSURE
  - Measure from -300 to 1100 hPa.
- SOIL MOISTURE
- SOLAR RADIATION
- MOTION AND OCCUPANCY DETECTION
- EQUIPMENT TEMPERATURE/FAILURE
- CO_2
  -Measure carbon dioxide level
- VOLTAGE

The system is programmable so that the sampling frequency of the above sensors can be controlled. This can vary from milliseconds to hours depending on the above sensor and requirements of the application.

CONTROL OUTPUTS

The Orbis Wireless Sensor can also be used to relay a control output to a control panel. This can be a bi-directional signal. As shown in the previous section it can relay to the control panel the resulting data from the sensor such as temperature, soil moisture or an equipment alarm. The control panel can then take action based on this data as if the sensor was directly wired (i.e. – turn on a sprinkler, turn off equipment).

The Wireless Sensor can also receive a message from the control panel and relay to the device that needs to be activated. In the above examples this would be the water valve actuator or the HVAC equipment that was in alarm.

The Orbis Wireless Sensor will transparently relay control outputs across the network enabling it to support/ interface to a wide range of signal types. Currently supported are the following:

- EQUIPMENT ON / OFF – Sends a signal to turn on / off the designated equipment.
- TEMPERATURE CONTROL – Sends a signal to increase / decrease temperature
- IRRIGATION CONTROL – Sends a signal to activate an irrigation system

OPTIONAL WI-FI – BLUETOOTH GATEWAY

The Orbis Mesh Radio system can be operated with or without a gateway.

- AUTONOMOUS OPERATION

  For autonomous operation between sensors and a control panel, the wireless sensors can communicate directly amongst themselves in a self configuring mesh network. In this manner they operate transparently relaying signals across the Bluetooth Mesh Network.

- GATEWAY OPERATION

  If desired, the system can be expanded with a Wi-Fi – Bluetooth Gateway. As its name implies it provides a gateway between the signals transported across the Bluetooth Mesh Network and converts them into an IP format that can be delivered anywhere in the world via the Internet. Signal integrity and security is maintained over the Internet as it is on the Bluetooth network.

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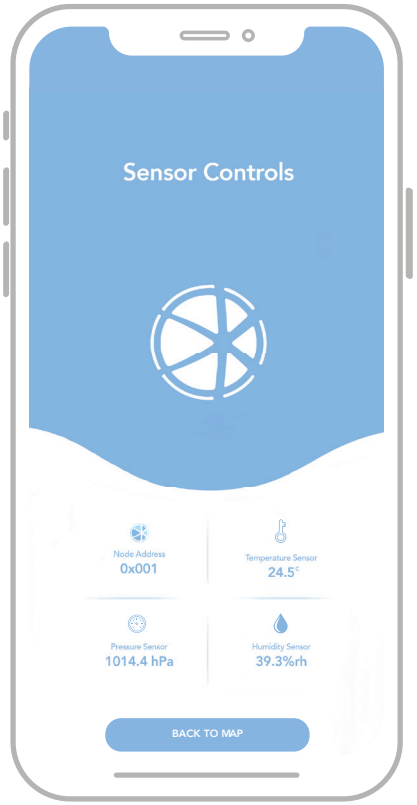


SMARTPHONE APPLICATION

The Orbis Mesh Smartphone Application shown to the left enables a user in real time from anywhere in the world (with secure authenticated access) to see the data from each sensor.

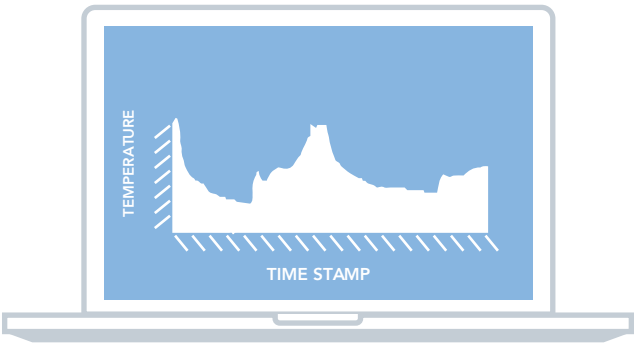
The app provides a comprehensive overview with detailed readings of each individual sensors. Farmers for example can click each Sensor Icon (shown left) on our App to see temperature, humidity, and pressure readings; updated continuously at custom designed rates.

Each sensor can be named within the application and overlaid on a map to show its location.

DESKTOP APPLICATION

With the desktop application, the sensor data is delivered to a secure URL addressed hosted by Orbis Mesh Technologies.

Here the data can be viewed in real time just like the Smartphone app above or it can collected and graphed over an extended period of time. A mockup of a resulting graph is shown on the right.



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