O₃ Sensor Hub 2.0
“To become the industry standard between room engagement and building Services.”

The Sensor Hub 2.0 is an open platform - with multiple interfaces, it is possible to communicate with and integrate into almost any system.
**OBSERVE & REPORT**
The O3 Sensor Hub will observe its surrounding environment and report its findings back to a controller or the supervisory platform.

**SENSOR FUSION TECHNOLOGY**
Sensor Fusion Technology monitors over eight space characteristics, then sends a combination of raw and processed data to local controllers and supervisory systems.

**CLOUD CONNECTIVITY & USER ENGAGEMENT**
Virtually touchless installation, setup and commissioning practices combined with unique yet simple user engagement methodologies.
O3 Sensor Hub 2.0
Technologies – What you get!

CONVERGING TECHNOLOGIES

• **SENSOR FUSION**
  Multiple sensors found in one package – all combined to understand the space environment.

• **DUAL-PORT ETHERNET**
  Easy installation, High-speed data transfer.

• **PROVIDING DATA WHERE YOU WANT, WHEN YOU WANT**
  MQTT, Native BACnet, BTLE API, REST API

• **O3 APP**
  New O3 App for provisioning and commissioning devices quickly and easily

• **TWO UNIVERSAL I/O**
  Two universal inputs and outputs provide rudimentary control straight from the Hub.

• **ONBOARD USER FEEDBACK**
  LED ring and audio outputs provide immediate user feedback and/or changing environment conditions.

• **EMBEDDED METRICS**
  Onboard algorithms used to help identify the operation, functionality, and reliability of the device.
Onboard Sensor Options

The Product

- Occupancy (PIR + Audio)
- Infrared Temp.
- Humidity
- Temp.
- Audio Output
- CO₂ (external)
- Light Color
- Light Level
- LED Ring
- Wireless
- Wireless
- Wireless
- Audio Signatures
- IR Blaster
The O3 Hardware

- Temperature - local and occupant height. IR and air temperature sensors.
- Humidity - Relative humidity at ceiling and also at occupant height.
- Light intensity, RGB components, and colour temperature all reported.
- Occupancy detection - algorithm uses PIR motion, audio, and IR sensors.
- Audio out - customize sounds play through integrated speaker.
- IR interface - let the O3 control AV and other equipment directly.
- Full BLE communications available - integrate with iOS and Android easily.
- Dual ethernet ports - supports BACnet, MQTT, and REST interfaces.
- Optional EnOcean radio supports connectivity to self-powered wireless sensing solutions for batteryless applications.
Temp Sensor Fusion

- **3 TEMP SENSORS**
  - Combines sensor readings together with machine learning techniques to model temperatures accurately

- **MACHINE LEARNING**
  - Observes measurements over time to produce predictions that are more accurate than those based on a single measurement.
Combining sensor technologies to give better accuracy

IR is 15 minutes faster than a wall-stat

Save energy on occupancy, and vacancy cycles

Calibrate to the desired temperature, at the desired location
### Occupancy Sensor Fusion

#### 3 SENSORS
- PIR – check for motion
- Microphone – measure noise
- IR – heat spikes (i.e., People)

#### MACHINE LEARNING
- Only PIR will trigger occupancy
- Sound only considered after occupancy trigger to latch on
- Ambient noise filtered out
Sensor Hub Location
Location

- Closer to occupant
- Avoids indirect sunlight
- Optimal radio antenna position
- Easy to move walls/equipment
- Solution for wall acne

Ideal location for:
- Occupancy detection
- Tamper avoidance
- Open office cubicles
- T-bar vs wall installation
Wireless

- Sensing and control devices
- Great for retrofit
- Window / door contacts

IR BLASTER
- Sensing and control devices
- Great for retrofit

- Bluetooth beacon
- Ble 5.0 interface
Standard Connectivity

- Dual-port ethernet connection
- Bluetooth low energy (BLE 5.0)
- 2 universal I/O ports
Open Platform
Integration With Any System

Open System Using Standard Protocols
- Native BACnet communications
- MQTT and REST APIs allow for 3rd party development and integration
- BLE API for custom app development
Sensor Hub 2.0

Security

NFC
• NFC used for initial local network setup
• Ability to lock NFC Read/Writes after configuration

BLE
• AES-HMAC encryption
• Customizable passcode
Sensor Hub 2.0
Security

BACnet/SC
• Optional BACnet Secure Connect available

RESTful API
• TLS Security

MQTT
• TLS Security
• Encrypted connection between the MQTT broker and MQTT client using a trusted certificate on the Client
Simplify the Installation/Setup Process

- Move onsite configuration to the office using pre-programmed templates
- Reduce commissioning time to improve overall efficiency and profitability
- Easy to setup and configure by anyone
BLE API allows for custom app development
Most Advanced Device in a Room

Think.
- Sensor Fusion
- Instant Occupancy

Sense.
- IR + Thermistor
- PIR + Sound
- Light Intensity + Color
- Humidity
- EnOcean

Speak.
- Play Sounds
- Color Ring
- Mobile Setup App
Benefits for Everyone

Cost.
- Multi-sensor cluster
- Installation in ceiling
- Twist-in mounting plate
- Free to move office walls, equipment, etc
- Web App provisioning tool and O3 Mobile Setup App

Experience
- Control temperature at occupant location
- Bluetooth connectivity
- Bluetooth beacon
- Light & sound interaction
- Open platform to allow integration into any system

Savings.
- Energy - Instant occupancy
- Energy - Indirect light sensing (daylighting)
- Tamper avoidance
- Free to move office walls, equipment, etc
- Increase occupant comfort and productivity