O3 Sensor Hub 2.0

Delta CONTROLS
A Delta Group Company

Rev 4

New Product

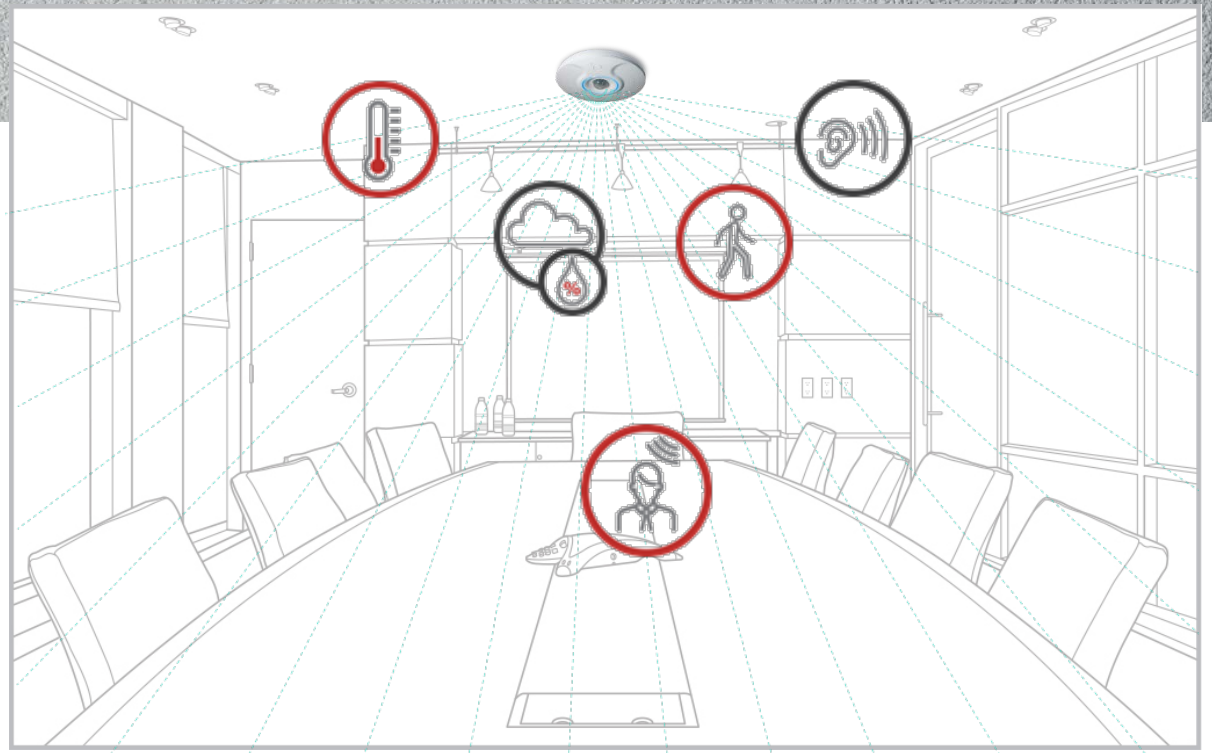
“To become the industry standard between room engagement and building Services.”

The Sensor Hub 2.0 is an open platform - with multiple interfaces, it is possible to communicate with and integrate into almost any system.

O3 Sensor Hub 2.0

O3 Sensor Hub 2.0

The Product



WHAT IT DOES!

OBSERVE & REPORT

The O3 Sensor Hub will observe its surrounding environment and report it's 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

THINK. SENSE. SPEAK.

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

CO_2
(external)

Light
Color

Light
Level

LED Ring

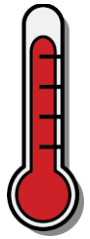
Wireless

Wireless

Audio
Signatures

IR Blaster

The O3 Hardware



Temperature - local and occupant height. IR and air temperature sensors.

Occupancy detection - algorithm uses PIR motion, audio, and IR sensors

Full BLE communications available - integrate with iOS and Android easily

Humidity - Relative humidity at ceiling and also at occupant height

Audio out - customize sounds play through integrated speaker

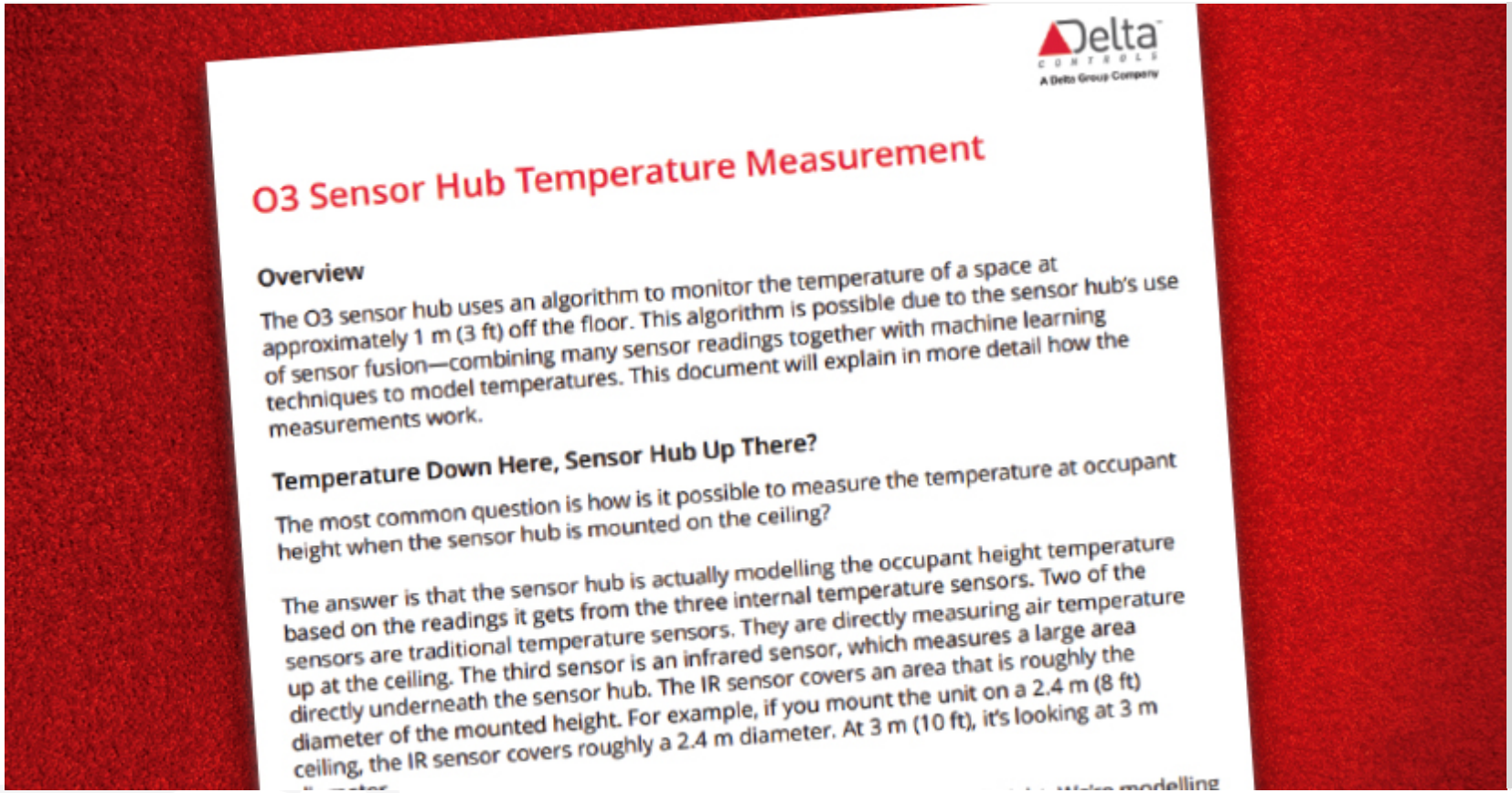
Dual ethernet ports - supports BACnet, MQTT, and REST interfaces

Light intensity, RGB components, and colour temperature all reported

IR interface - let the O3 control AV and other equipment directly

Optional EnOcean radio supports connectivity to self-powered wireless sensing solutions for batteryless applications

Temp
Sensor Fusion



Delta CONTROLS
A Delta Group Company

O3 Sensor Hub Temperature Measurement

Overview

The O3 sensor hub uses an algorithm to monitor the temperature of a space at approximately 1 m (3 ft) off the floor. This algorithm is possible due to the sensor hub's use of sensor fusion—combining many sensor readings together with machine learning techniques to model temperatures. This document will explain in more detail how the measurements work.

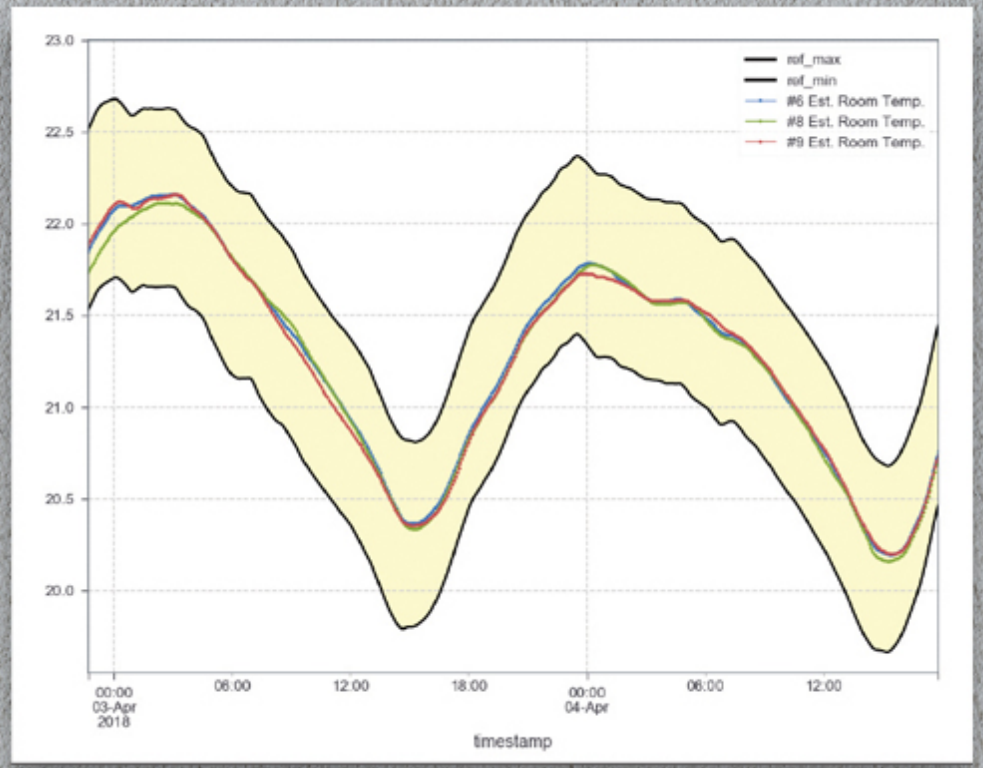
Temperature Down Here, Sensor Hub Up There?

The most common question is how is it possible to measure the temperature at occupant height when the sensor hub is mounted on the ceiling?

The answer is that the sensor hub is actually modelling the occupant height temperature based on the readings it gets from the three internal temperature sensors. Two of the sensors are traditional temperature sensors. They are directly measuring air temperature up at the ceiling. The third sensor is an infrared sensor, which measures a large area directly underneath the sensor hub. The IR sensor covers an area that is roughly the diameter of the mounted height. For example, if you mount the unit on a 2.4 m (8 ft) ceiling, the IR sensor covers roughly a 2.4 m diameter. At 3 m (10 ft), it's looking at 3 m

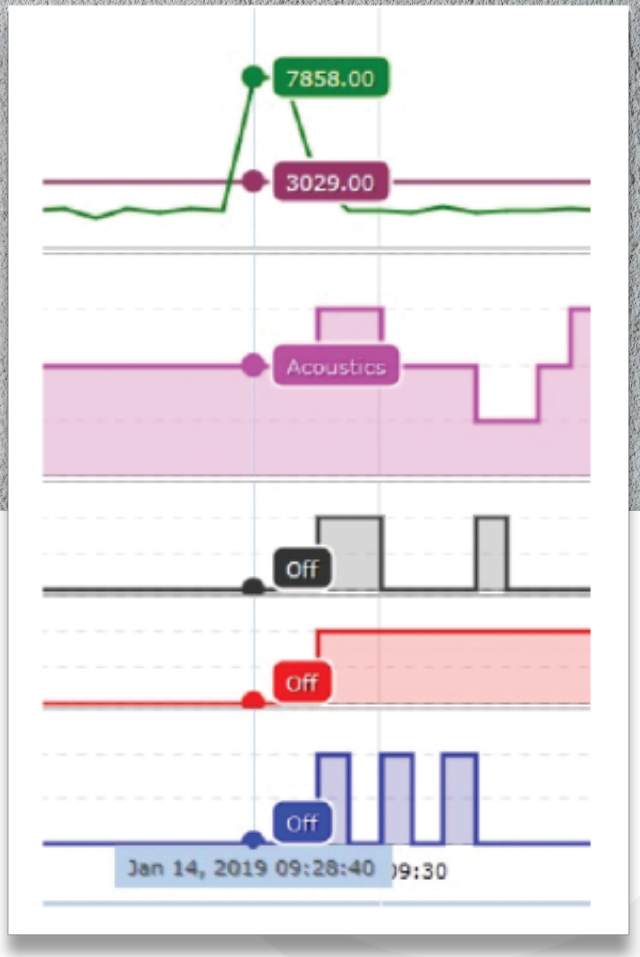
- 3 TEMP SENSORS
  - Combines sensor readings together with machine learning techniques to model temperatures accurately
- MACHINE LEARNING
  - Observes measurements over time to produce predictions that are more accurate than those based on a single measurement.

Temp
Sensor Fusion



- 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)

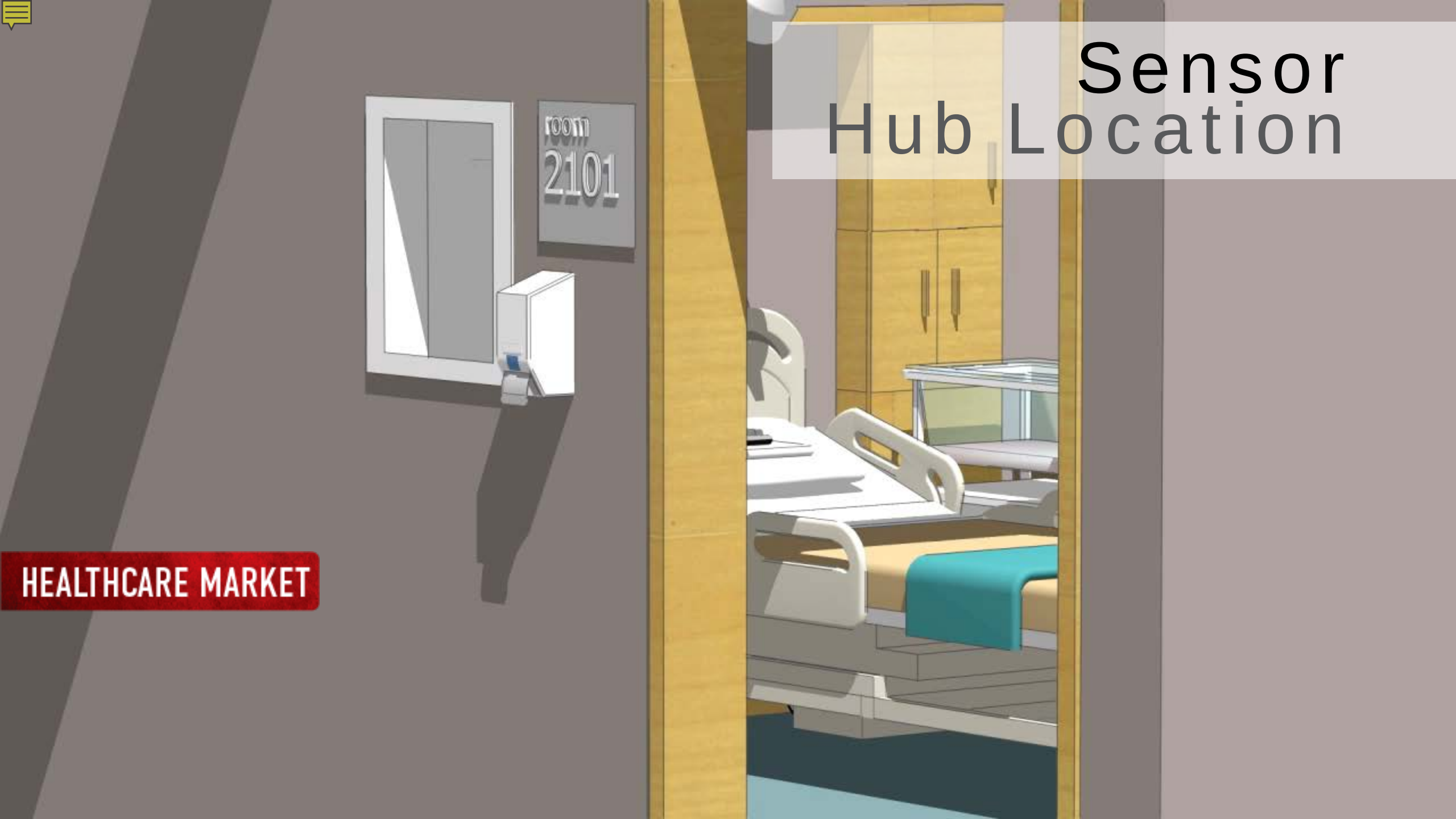
- MACHINE LEARNING
  - Only PIR will trigger occupancy
  - Sound only considered after occupancy trigger to latch on
  - Ambient noise filtered out

Sensor Hub Location

EDUCATION MARKET

Delta CONTROLS
A Delta Group Company

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

enocean®

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

- Bluetooth beacon
- Ble 5.0 interface

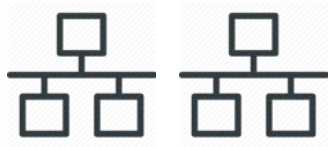
IR BLASTER

- Sensing and control devices
- Great for retrofit

Standard Connectivity

Standard Connectivity

- Dual-port ethernet connection
- Bluetooth low energy (BLE 5.0)
- 2 universal I/O ports



Dual Ethernet

BLE API

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

Native BACnet

MQTT API

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

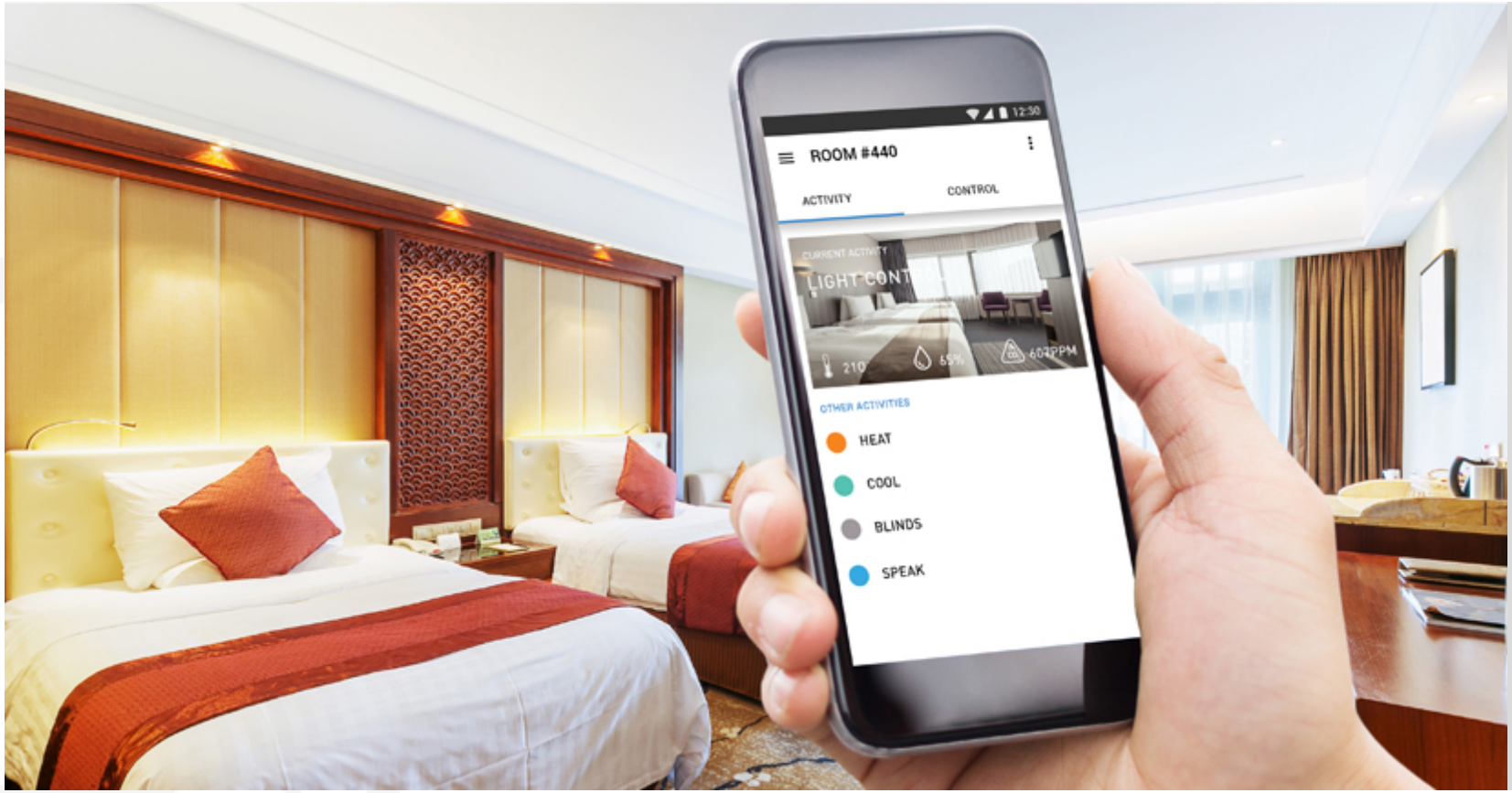
O3 Installation App

Sign in with Google

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
Security



- 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