

# O<sub>3</sub> Sensor Hub



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# New Product

- THINK. SENSE. SPEAK.
- ADVANCED SENSOR TECHNOLOGY  
AND TOTAL ROOM INTEGRATION



○<sub>3</sub> Sensor Hub



# New Product



O<sub>3</sub> Sensor Hub

# New Breakthrough Product

- LIKE A THERMOSTAT...BUT BETTER
- BREAKTHROUGH! SENSOR FUSION
- BREAKTHROUGH! EXPERIENCE
- CONNECT TO O<sub>3</sub> CPU
- CEILING MOUNT

# New Product



 Sensor Hub 2.0

## What is it?





# New Name

## NOT AN ACRONYM

- THINK. SENSE. SPEAK.
- ADVANCED SENSOR TECHNOLOGY  
AND TOTAL ROOM INTEGRATION



O<sub>3</sub> Sensor Hub



# Sense.



TEMPERATURE  
IR | THERMISTORS

Sense.



OCCUPANCY  
PIR | AUDIO | IR

Sense.



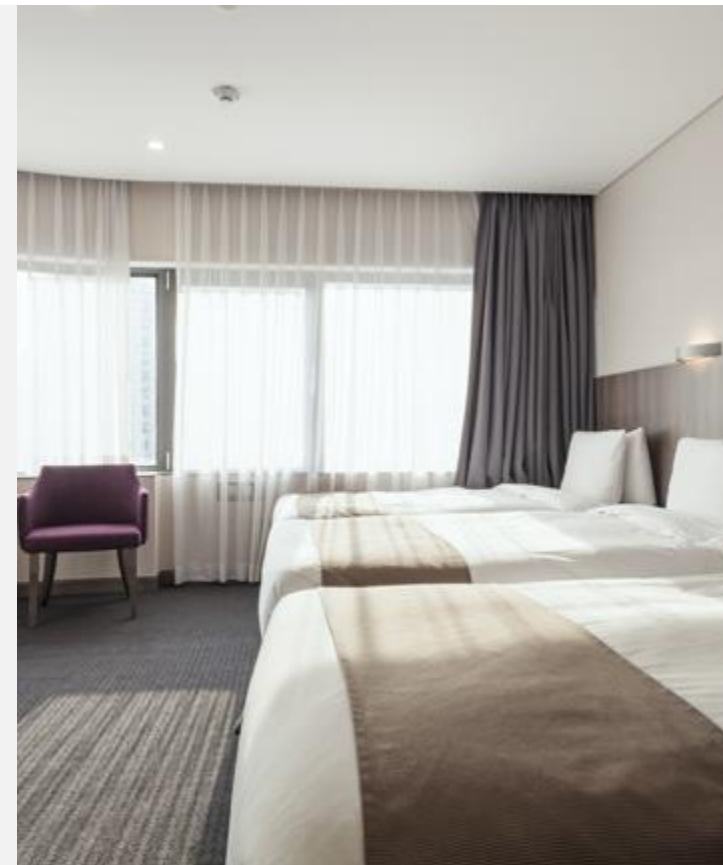
LIGHT COLOR  
LIGHT INTENSITY

Sense.

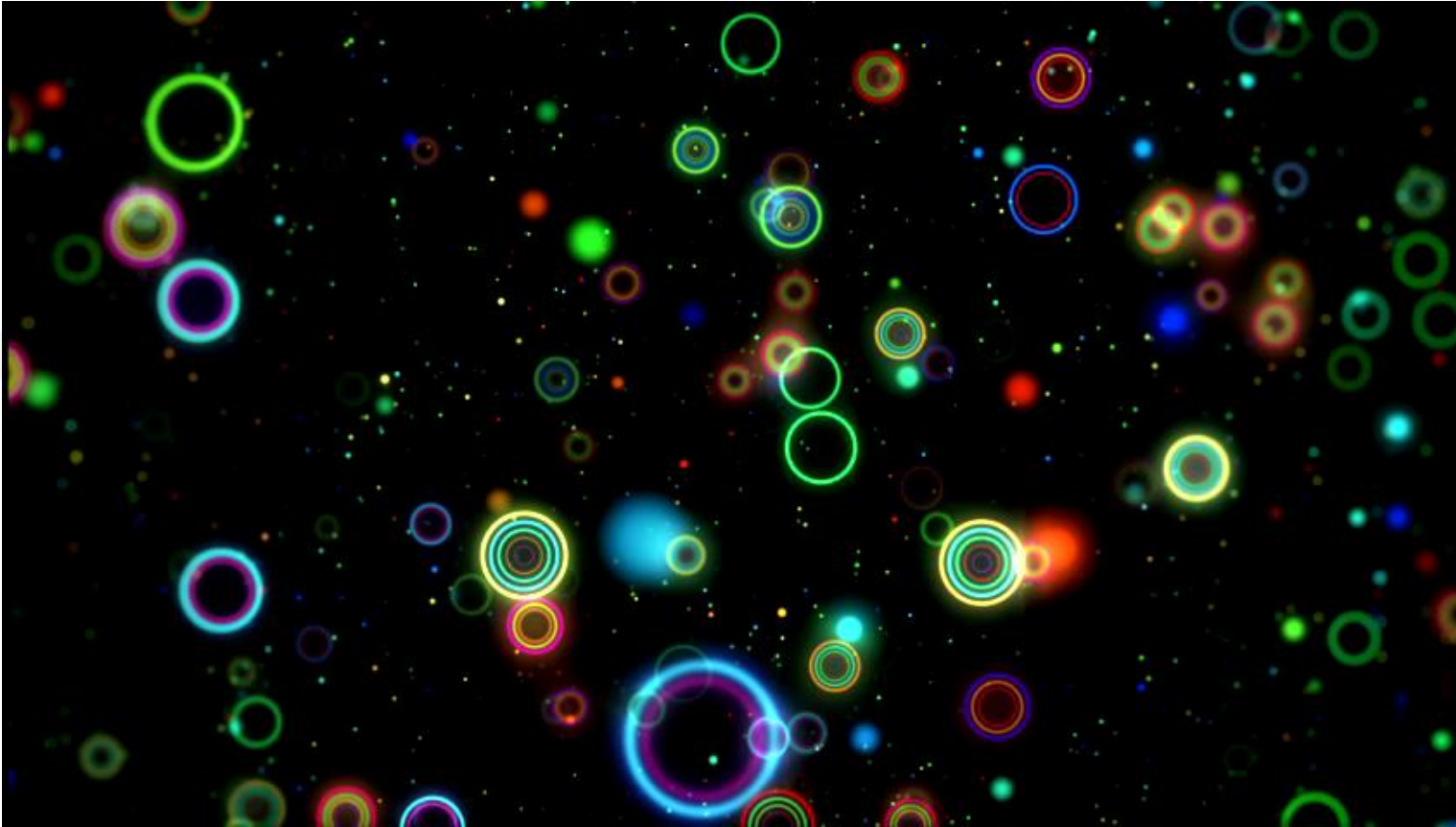


HUMIDITY

Sense.



# Speak.



○ WITH COLOR  
○ WITH MUSIC



# Think.



You shouldn't do things differently just because they're different. they need to be... better.

- TEMP SENSOR FUSION
- OCCUPANT SENSOR FUSION
- O3 CONTROLLER  
+ O3 APP  
+ enteliWEB



# Temp Sensor Fusion

## 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?

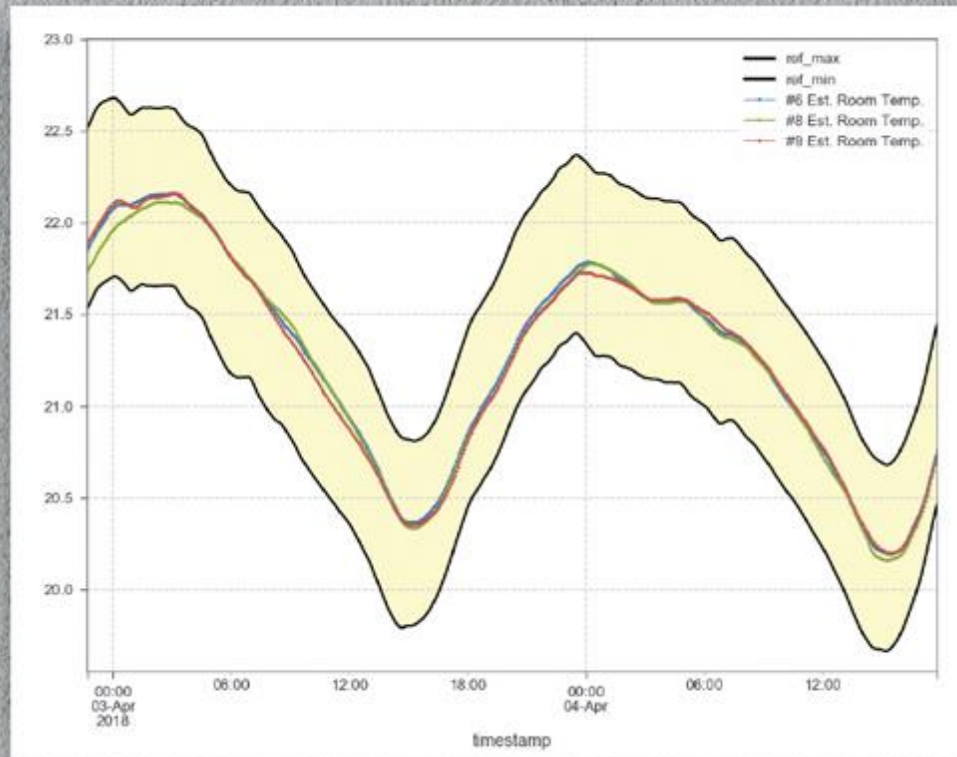
The most common question is how is it possible to measure the temperature at occupant height when the sensor hub is mounted on the ceiling?

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
- MACHINE LEARNING
  - KALMAN FILTERING
  - MODELLED OVER TIME

# Temp Sensor Fusion



- COMPOSITE
- IR + THERMISTOR
- ACCURACY



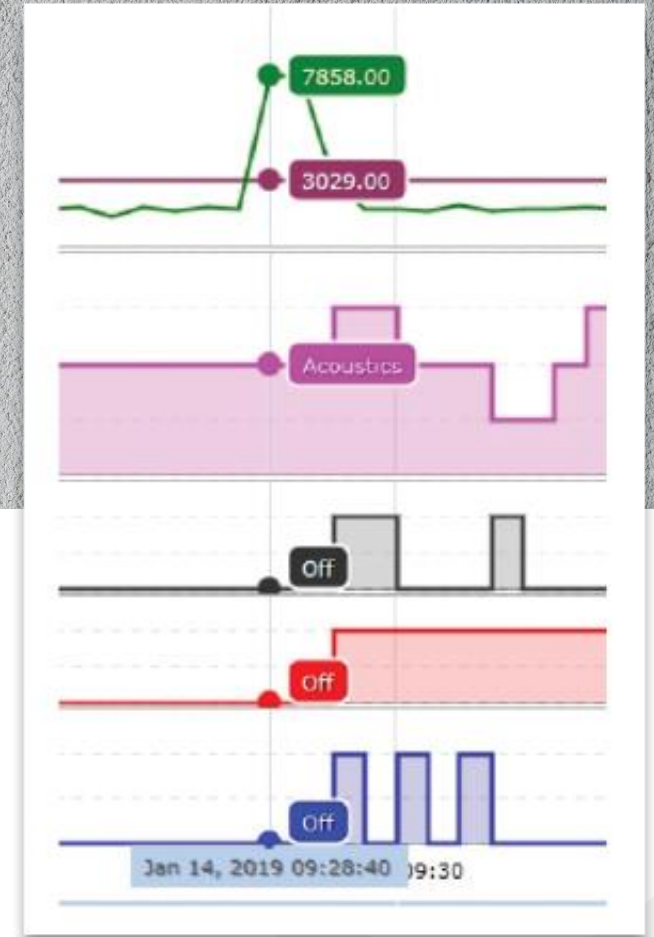
# Occupancy Sensor Fusion

## 3 SENSORS

- PIR – CHECK FOR MOTION
- MICROPHONE – MEASURE NOISE
- IR – HEAT SPIKES (I.E. PEOPLE)

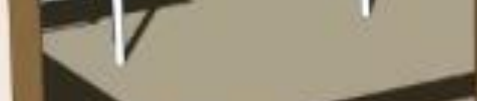
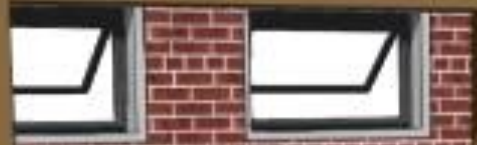
## MACHINE LEARNING

- ONLY PIR WILL TRIGGER OCCUPANCY
- SOUND ONLY CONSIDER AFTER OCCUPANCY TO LATCH IT ON
- AMBIENT NOISE FILTERED OUT





# LOCATION





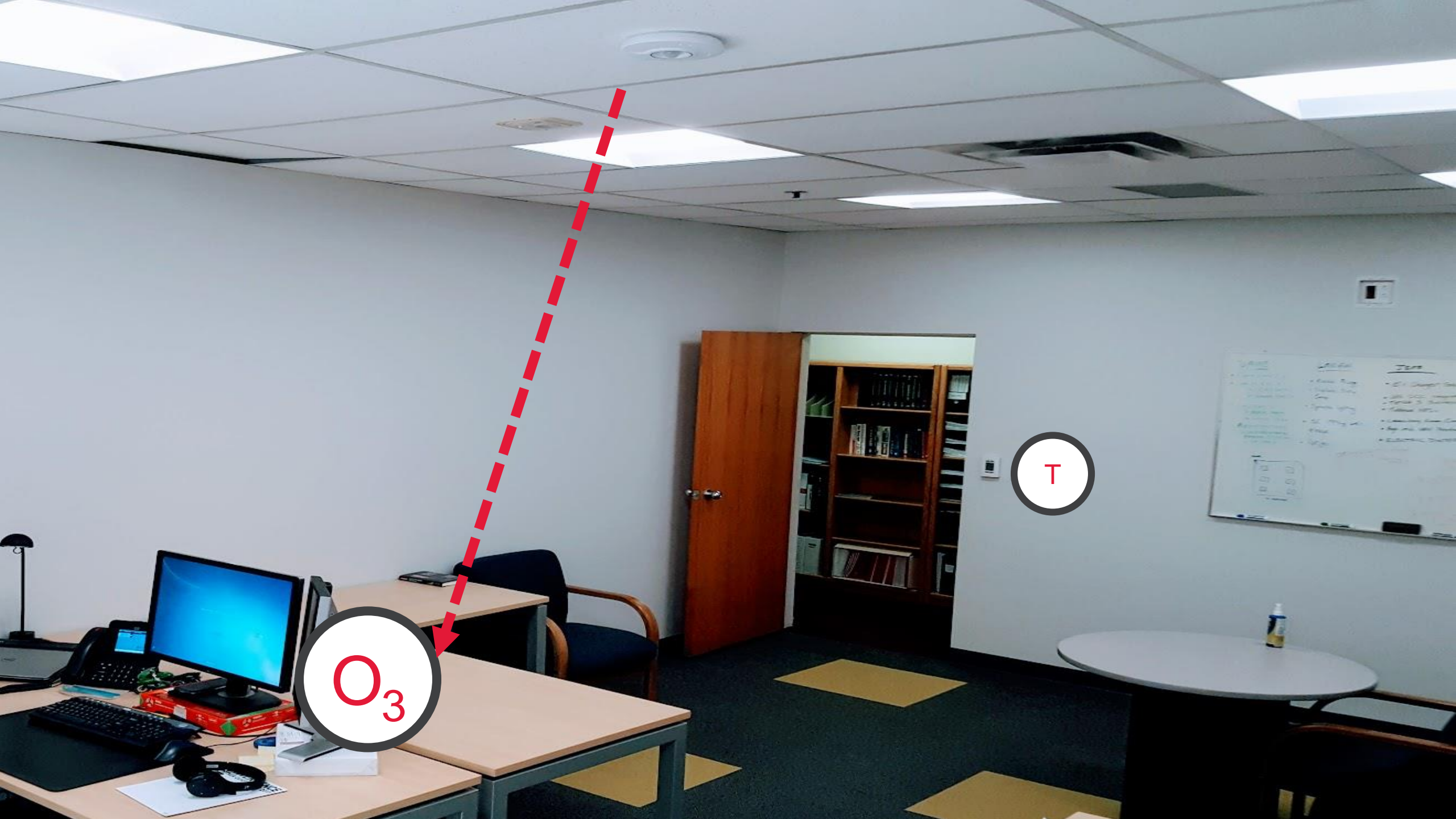


# Location

- CLOSER TO OCCUPANT
- INDIRECT SUNLIGHT
- RADIO ANTENNA
- EASY TO MOVE WALLS / EQUIPMENT
- WALL ACNE

- OCCUPANCY
- TAMPER AVOIDANCE
- OPEN OFFICE CUBICLES
- T-BAR vs WALL INSTALLATION





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T



# Wireless



- SENSING AND CONTROL DEVICES
- GREAT FOR RETROFIT
- WINDOW / DOOR CONTACTS



- MORE ON THIS IN A MOMENT



## IR BLASTER

- SENSING AND CONTROL DEVICES
- GREAT FOR RETROFIT
- WINDOW / DOOR CONTACTS



# O<sub>3</sub> App



- ROOM LOCATION  
HUBS KNOW WHEN YOU'RE NEARBY

- EASY

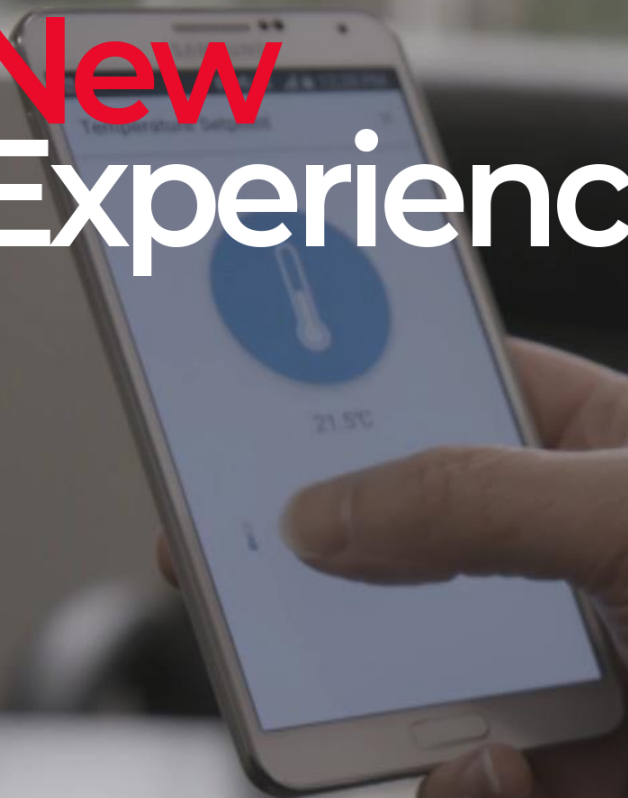


Sign in with Google

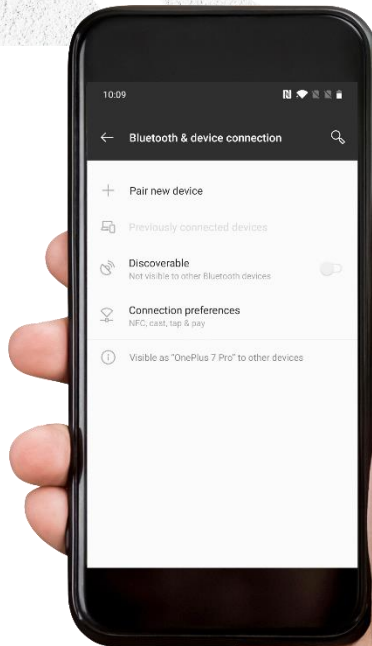
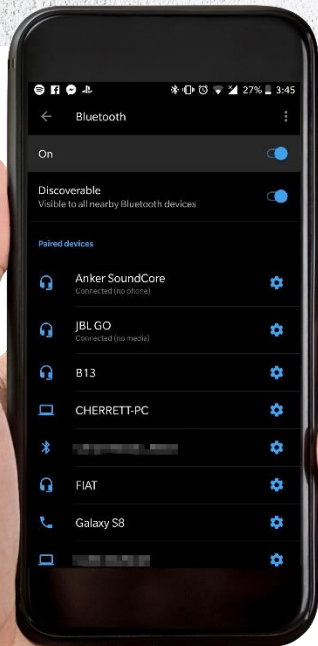
- EXPERIENCE  
ACTIVITY CONTROL  
HUB FEEDBACK – LED RING, SOUND



# New Experience



# New Experience



- BEACON BROADCASTS MESSAGES TO NEARBY DEVICES
- MOBILE DEVICES DISPLAY LOCATION-BASED MESSAGES

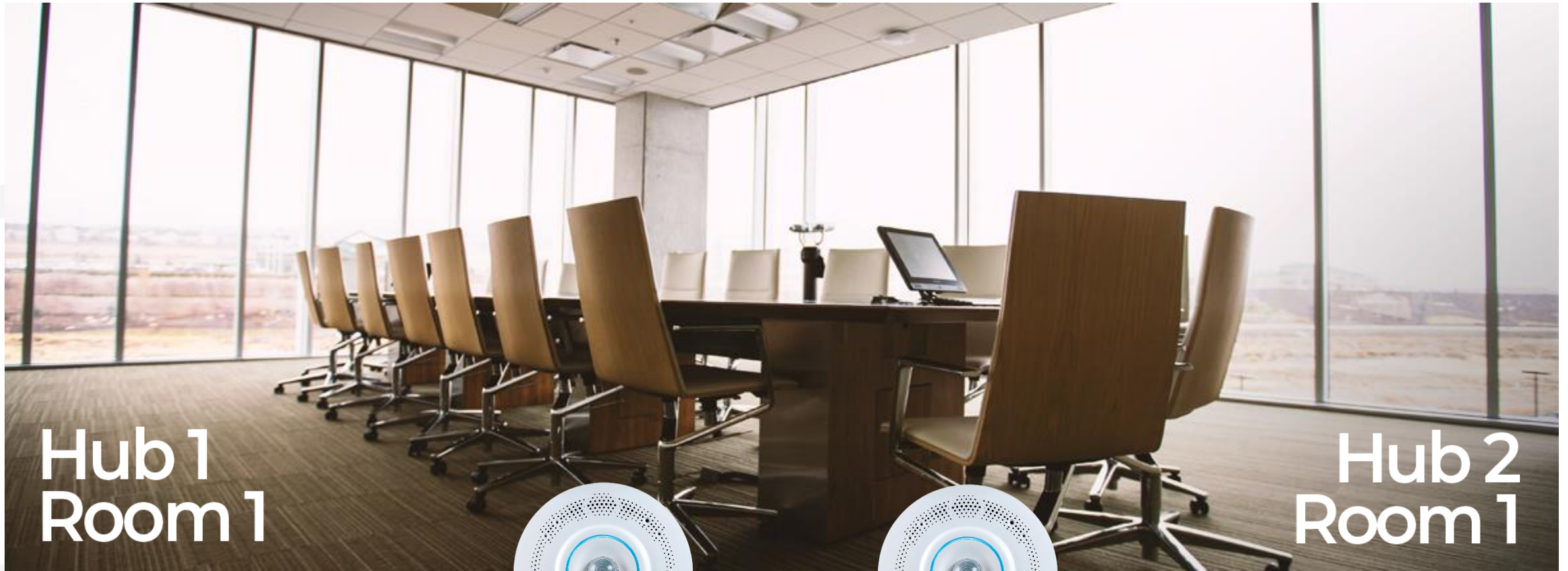


# New Experience



- BEACONS ARE ABOUT PROXIMITY
- CLOSEST ROOM IS LISTED ON TOP
- MULTIPLE HUBS CAN BE BOUND TO ONE ROOM, FOR OPEN OFFICES

# New Experience



Hub 1  
Room 1

Hub 2  
Room 1

○ — ○ Near  
○ — ○ Far

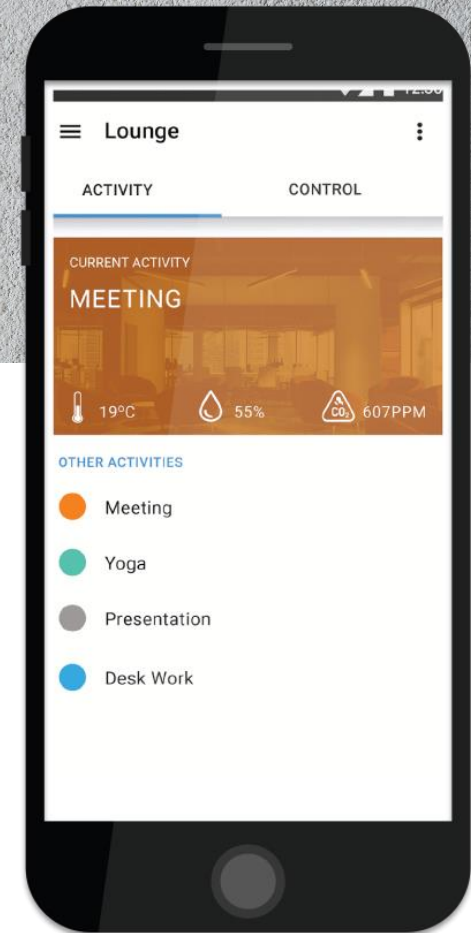


Far ○ — ○  
○ — ○ Near



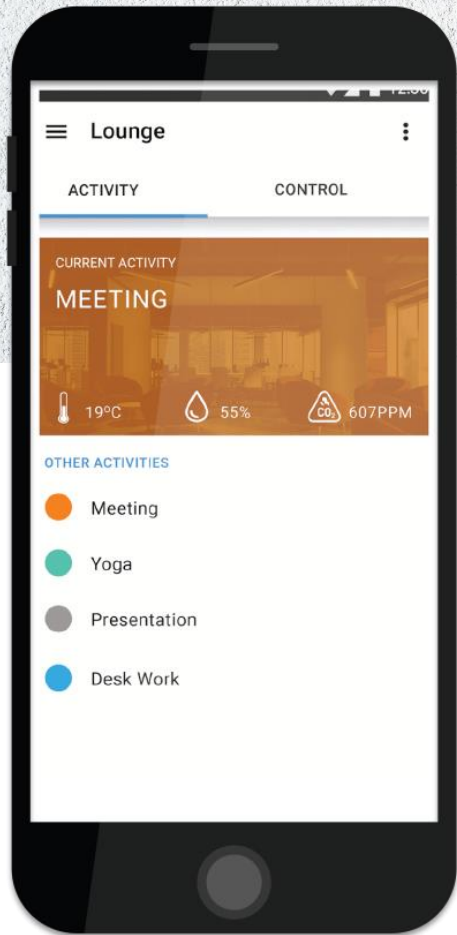
# Activity Based Control

- ONE-TOUCH CONTROL  
LIGHT LEVEL, BLIND POSITION, TEMP SETPOINT
- CUSTOMIZED  
NOT “CANNED”  
PROGRAM CUSTOM ACTIVITIES
- RE-USABLE  
STORED IN EWEB  
CREATE ONCE USE IN MULTIPLE ROOMS





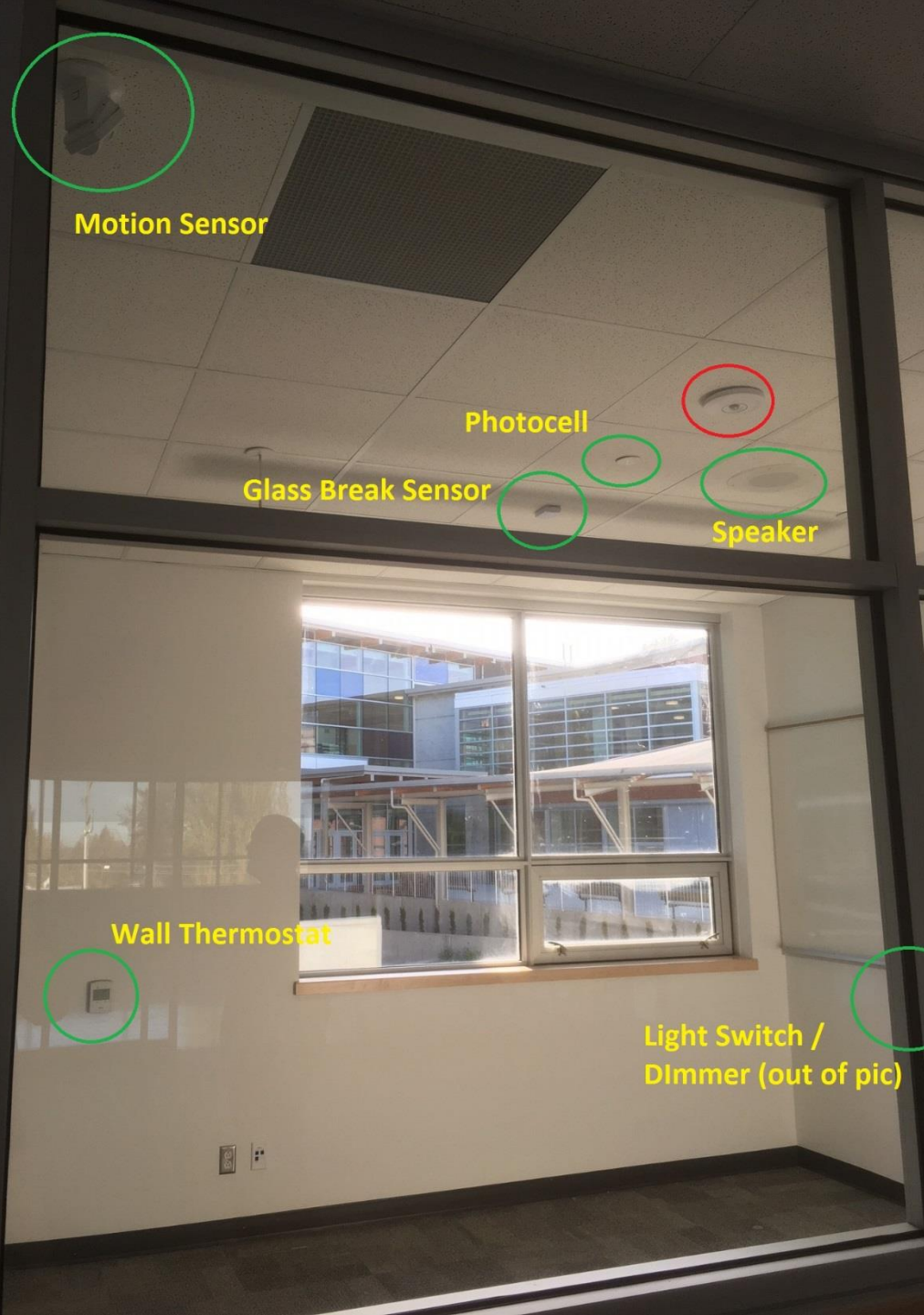
# Take Control



- EXPLICIT CONTROL  
LIGHT LEVEL, BLIND POSITION, TEMP SETPOINT
- ROOM SPECIFIC  
ONLY EQUIPMENT IN ROOM IS DISPLAYED
- OCCUPANT RULE  
PERMISSIONS IN EWEB



# Target Room



- SCHOOL:  
COULD REPLACE 6 DEVICES WITH ONE O3 HUB

# Most Advanced Device in a Room

## Think.

- Sensor Fusion
- Instant Occupancy
- Activity Based Control
- Programmable O3 CPU

## Sense.

- IR + Thermistor
- PIR + Sound
- Light Intensity + Color
- Humidity
- EnOcean
- One Sensor – HVAC,
- Lighting, Access

## Speak.

- Play Sounds
- Color Ring
- Mobile App



# Benefits for Everyone

## Partner Cost.

- Multi-sensor cluster
- Installation in ceiling
- Twist-in mounting plate
- Free to move office walls, equipment, etc

## Experience.

- Control temperature at occupant location
- Bluetooth beacon
- Mobile app
- Trust – light & sound interaction
- No wall acne

## Owner Savings.

- Energy - Instant occupancy
- Energy - Indirect light sensing (daylighting)
- Tamper avoidance
- Free to move office walls, equipment, etc