

ecDeskSensorSystem and Ambient Intelligence

Empty desks are like a massive untapped natural resource.



Every year, the nation spends approximately [\\$200 billion in energy](#) for commercial buildings. Yet, during the workday the desks are unoccupied average of 50%, wasting a potential \$100 billion dollars a year.

The corporate workplace is changing before our eyes. Gone are the days when every employee sat at their desk from 9:00am to 5:00pm. The workforce is increasingly mobile, and as a result, more and more office spaces are unused every day.

There is an old established energy saving sequence that's been proven throughout the years it's called; **Turn It Off!** With the sophistication of wireless sensors and software, we should be able to improve temperature and lighting comfort while allowing energy savings to pay for the upgrades.

Why not turn off **individual** HVAC, Lighting and Plug Loads, when they're not required or when unoccupied? Occupancy sensing, temperature sensing, plug load sensing and light level sensing are required to reach our goals of individual energy savings and individual comfort.

Urbanization of the workplace is becoming part of commercial real estate and providing each desk occupant with calculated energy metering of their HVAC, lighting and plug loads will be part of the future for office facilities.



Ambient Intelligence

“Electronic environments that are sensitive and responsive to the presence of people.” — Wikipedia

The frequencies of occupants leaving their offices and the corresponding durations of absences can have significant impact on energy use and the operational controls of buildings.

There is no technological reason that prevents us from modifying the HVAC, lighting and plug loads within a building, and conform to the momentary needs of the occupants. We have the capabilities to add sensors and controls to a building. Add local logic and controls to the point of **individual** control in real-time. Even more than that, we're in a technological position of being able to create a state of **individual comfort** from room to room and desk to desk.

Occupancy sensing helps you understand your workers varying work patterns, respond quickly to their changing needs and adjust your strategy to reduce real estate costs. Indoor positioning can greatly reduce stress and management.

How can we use ambient intelligence to reduce energy and improve comfort conditions?

There are several ways ambient intelligence and wireless sensors are being used in the industry today.

“If it’s not cost justified, providing comfort and energy savings, building owners are not going to purchase.”

Wall and ceiling motion detectors costs are high because of mounting and electrical labor and no one wants thousands of batteries throughout the facility.

Chairs imbedded with pressure sensors to determine specific occupancy trends from room to room. Badges, cell phones track occupants, but still need to communicate to a central zone with several occupants and lack temperature and light level sensing.

Occupants can make individual **requests** for warm or cold air based on their comfort needs via a smartphone.



Without individual comfort control you'll never eliminate the fighting and discomfort that occur while multiple individuals are occupying the same zone-controlled condition space.

Temperature sensing in the ceiling is not an option because of airflow patterns. Ceiling temperatures fluctuate from the proximity of the air leaving the supply air diffuser and heat generated from the lighting.

One way to receive individual temperature, ambient intelligence, light level and plug load monitoring and that is to place the sensing device on the desk. The desk sensor with temperature, motion and light level can turn off the HVAC and lighting associated with the individual's desk.

As simple as ring.com the desk sensor could be on billions of desks throughout the world.

Unplug for Dollars: Stop 'Vampire Power' Waste

Your computers, peripherals, and electronics are eating up energy when you think they're off--and in no small amount, either. According to [GSA](#) leaving your computers on while unoccupied can account for \$1,000 to \$1,500 a year in waste per desk.

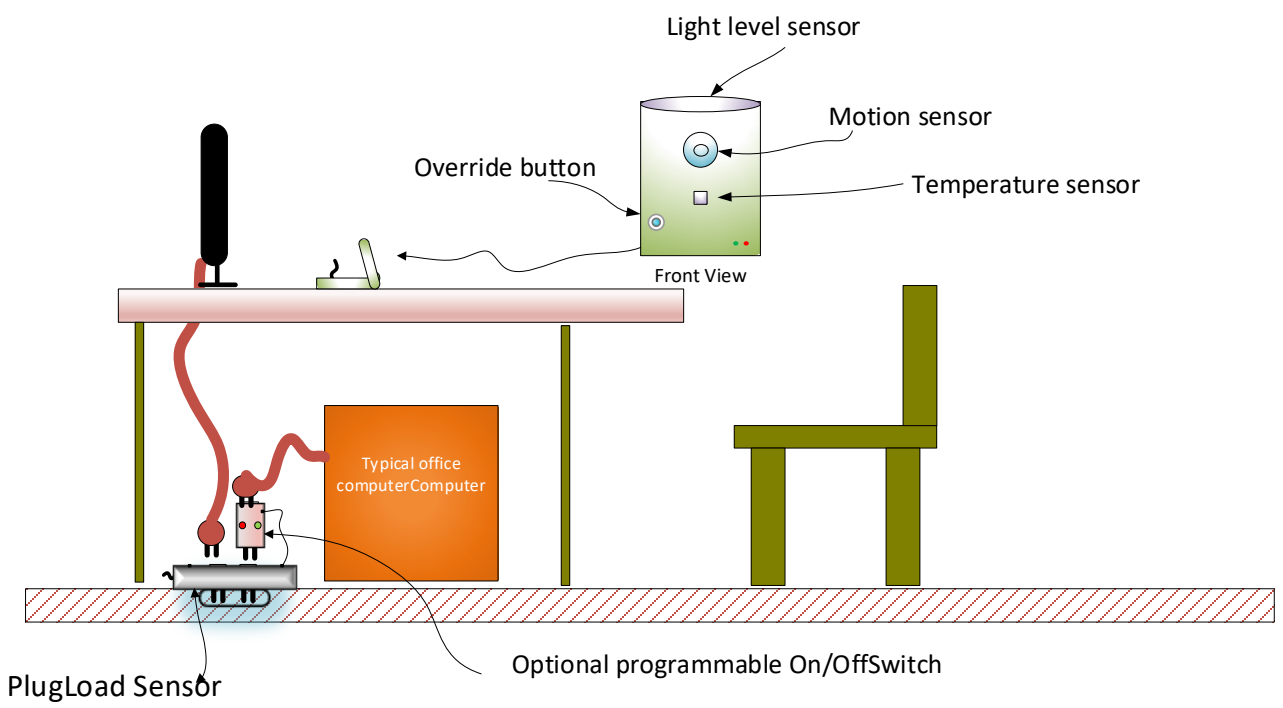
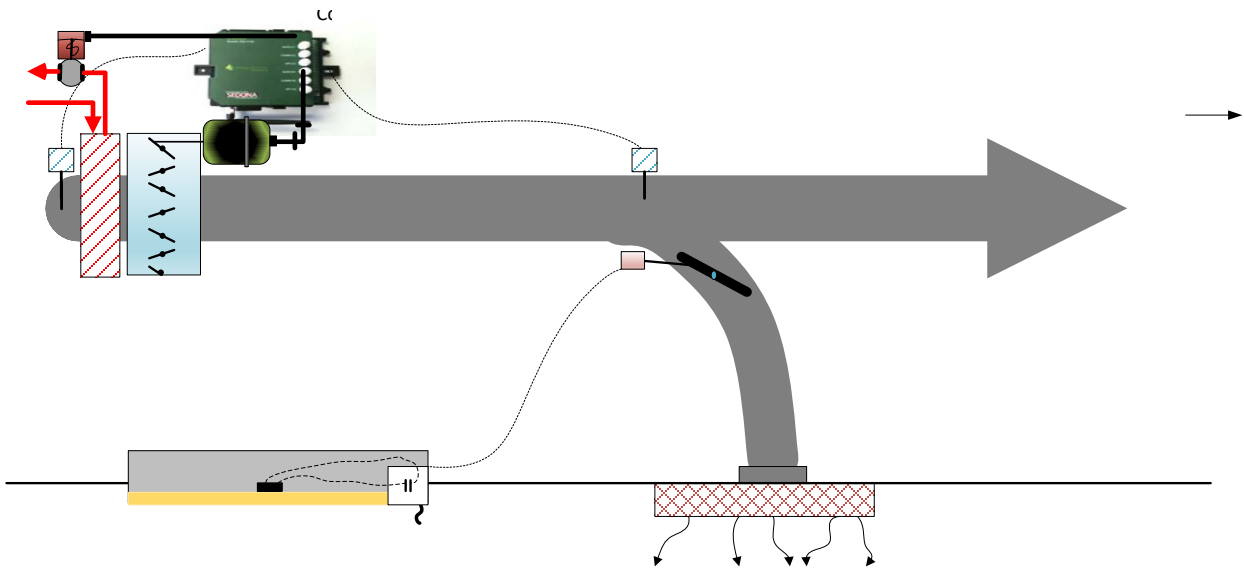


Plug loads can be sensed and held accountable to each desk occupant.

“What gets measured, gets managed”

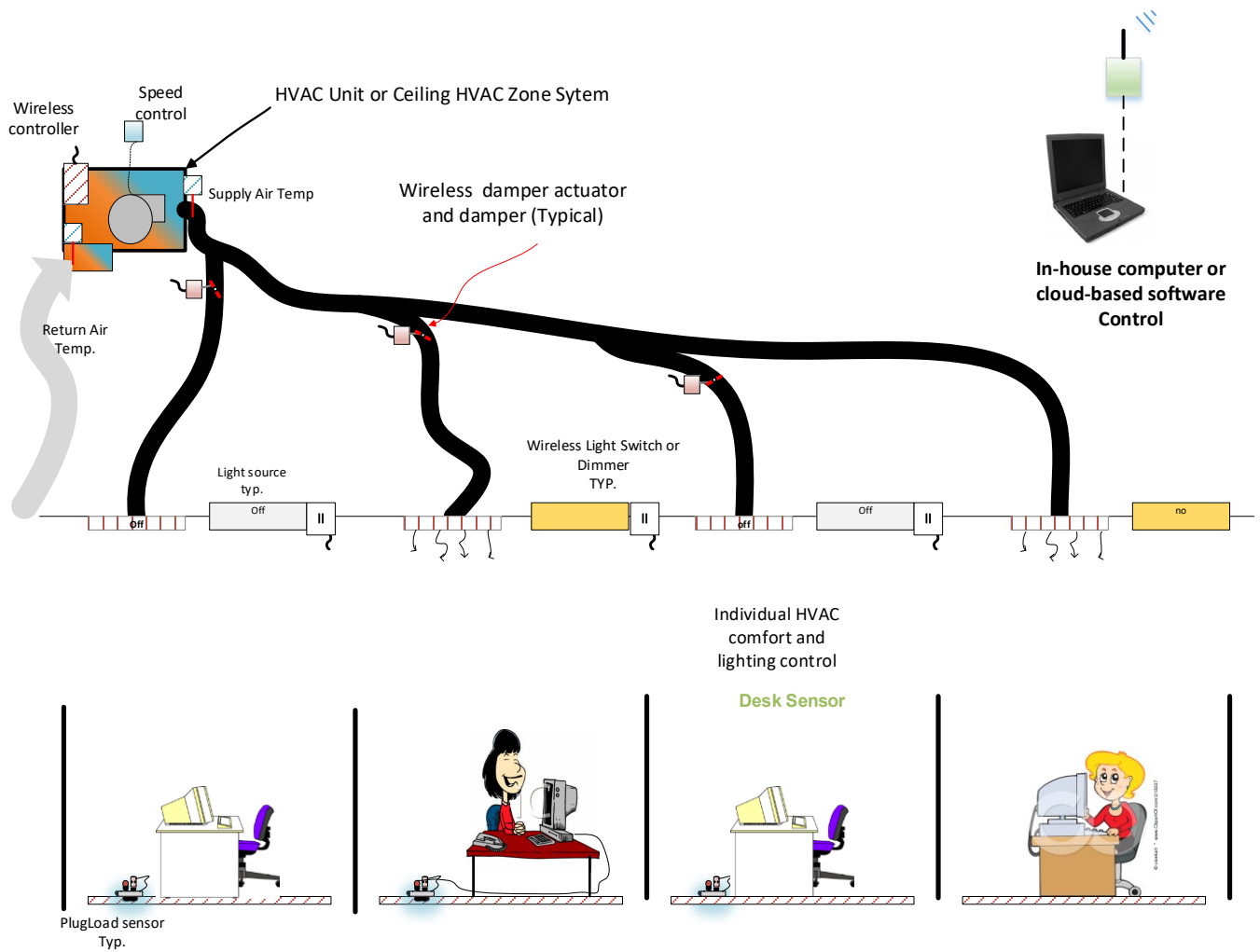
Metering plug loads is a necessary first step to realizing these savings. It's not recommended for the BMS system to simply turn off plug loads when unoccupied. The desk occupant must be **held accountable** by metering their individual plug loads when unoccupied and occupied. (\$/Time)

Workspace occupancy sensing helps you understand how your desks, meeting rooms and break out spaces are used in extraordinary detail. On a day-by-day and hour-by-hour basis, sensors gather data on your real estate use. By identifying both increases and decreases in real estate utilization, sensors deliver valuable intelligence to help determine if your workplace is meeting demand – both now and in the future.



HVAC, lighting and plug load monitoring all orchestrated from the desk sensor.

WorkStation, HVAC, lighting and plug load control



The above represents a lot of sensors, controls etc. maybe it's too expensive or maybe not.

Ambient Intelligence = Building Owner Intelligence



Building owners are skeptical about proposed energy savings. Ambient Intelligence can provide the building owners with **actual cost justified solutions** for purchasing **individual** comfort control

(automatic damper of air outlet diffuser) or wireless lighting control. Genuine ROI predictions! If we know the individual's occupancy, then we can predict our costs savings.



Combine the desk sensor with voice communications

Alexa, adjust my lights to level III, Alexa, close my drapes, Alexa, increased temperature 1°, Alexa, reserve conference room two, Alexa, why is my temperature high? HVAC is down for maintenance. Alexa are there any available conference rooms? Alexa, I need a hot desk for two hours. Etc. etc. etc.

Voice communications, convenient power and **no labor to install**. The labor costs to install a sensor on the wall or ceiling is the same cost as three desk sensors.

Corporate desire to optimize productivity has produced trends such as free lunches and dry-cleaning services on-site, part-time telecommuting options, and hot-desking. But while optimizing workers' time is important, many companies overlook ambient intelligence in simple location-based activities.

Space that works for the individual, whether at your desk, office suite, or entire HQ, environments that increase productivity, innovation, and collaboration.

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George Fincher
925-382-1660
Reno, NV

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