



Wireless Sensors and Analytics

What is this Technology?

When occupants interact with buildings, they generate valuable data that can be used to optimize the efficiency of building operations. Traditional wired systems designed to gather and analyze such data have been prohibitively expensive and disruptive to install. The technology under consideration here tests the promise of the Internet of Things (IoT) by using relatively inexpensive and easy-to-install wireless, lighting-fixture-based sensors that detect and record changes in occupancy, temperature, visible light, infrared radiation, and LED power consumption. This data can be used to determine whether a room is in use, for example, and set the thermostat and lighting to adjust to real-time occupant needs. Sensor data is wirelessly transmitted to local "gateway" nodes that gather and send them, via secure wires, to a centralized processor and user interface. Software analyzes the data and generates actionable recommendations for building management, so that although the sensor networks are deployed through the lighting fixtures, the information they collect and analyze can also be put to use for other kinds of coordinated control including security, space allocation, and asset management.

Why is GSA Interested?

Through smart sensor networks, GSA is investigating ways to capture, analyze, and utilize the valuable data that saturates working buildings. By analyzing a building's systems, managers can help optimize efficiency, quickly locate and repair problems, improve security and space use, and predict occupancy patterns in ways that allow for new levels of dynamic energy conservation.



ENERGY EFFICIENCY With the implementation of ALC strategies such as occupancy sensing, institutional tuning and daylight harvesting, lighting savings of > 25% are estimated. There is also the potential for additional energy savings from utilizing network occupancy data to optimize HVAC.



COST-EFFECTIVENESS The manufacturer estimates a payback under five years.



OPERATIONS & MAINTENANCE Commissioning and controls management are accomplished with remote access. The system meters energy consumption, providing real-time measurement and verification of energy savings. Lighting maintenance should be reduced through embedded luminaire-based fault diagnostics. Space utilization software facilitates room scheduling and can reduce janitorial expenses by focusing cleaning on highly trafficked rooms. The system may offer additional maintenance cost reductions with the integration of other building management systems.



DEPLOYMENT POTENTIAL The technology should be broadly applicable throughout the GSA portfolio.

The Green Proving Ground program, in association with a federal laboratory, is subjecting wireless sensor and analytics to real-world measurement and verification in GSA buildings. Results will be published on the GPG website, www.gsa.gov/gpg.



The Green Proving Ground program leverages GSA's real estate portfolio to test innovative building technologies. The program helps GSA meet its sustainability goals by providing actionable data that informs investment decisions targeted at energy-use reduction.