

# GSA 1800F



## C A S E S T U D Y

Using Building Controls to Reinforce Workplace Norms



# Overview

In 2013, guided by legislation to reduce energy use and leased assets, and to increase remote work, the General Service Administration (GSA) undertook a large-scale renovation of its headquarters. The renovation, designed to have 50% more employees than workstations, would become a flagship demonstration of the GSA's vision for the next generation of Federal office buildings. In 2009, as the GSA accelerated its Smart Buildings program, it engaged with Intelligent Buildings, LLC (IB), first to develop Smart Building data and network standards, then to transform the new GSA Headquarters into a Smart Building. At the same time, the GSA's workplace team was tasked with creating a hoteling workplace structure that would support the employee to workstation ratio and introduced hoteling software that would manage employee workstation reservations. IB then worked with the GSA to develop Use Cases integrating Smart Building technologies and the hoteling software. These Use Cases reinforced the norms of the new workplace structure through the built environment within the office by using integrated sequences across building systems. This Smart Building solution not

only improved the facility managers' experience and reduced energy use but also improved tenant comfort and helped the GSA Headquarters transition to the new hoteling work structure.

## The GSA looks to their Smart Building program to improve the employee experience in their renovated headquarters

### Legislative initiatives fuel the GSA Headquarters innovative renovation

The GSA manages an inventory of 1,500 government-owned buildings<sup>1</sup>. The agency's management of these assets is guided through legislation, and from 2005 to 2010, a set of new laws required the GSA to reduce existing federal building energy use by 30% over nine (9) years<sup>2</sup>, eliminate unneeded Federal real estate<sup>3</sup>, and promote remote work opportunities<sup>4</sup>. The GSA developed many projects to work toward these goals including renovating the GSA Headquarters. After the renovation, employees from another five (5) of the GSA's Washington D.C. locations would also move to the newly renovated building<sup>5</sup>, raising the number of employees at the building from 2,200 to 3,300. The GSA leveraged its existing Total Workplace and Smart Buildings programs to help make the project a success.

### The GSA's existing programs laid the groundwork for their ambitious renovation goals

The GSA estimates that a typical Federal office workstation costs over \$10,000 annually<sup>6</sup>. A 2010 study investigating how the GSA could best use remote work policies to cut real estate costs found that increasing remote work opportunities also benefited employees— improving productivity, recruitment, and retention. Yet in 2007, the GSA found that only 17% of eligible employees worked remotely<sup>7</sup>, leading to the development of the Total Workplace program to create a modern Federal workplace that reduces costs and increases productivity.

The GSA had long been a pioneer in Smart Building technology use, but by the mid-2000s, they had yet to realize the benefits of a coherent, portfolio-wide Smart Building strategy. The new legislated directives provided an opportunity to do just that. To begin that process, the GSA worked with the Lawrence Berkeley National Laboratory to create the Smart Buildings: Business Case and Action Plan report<sup>8</sup>. This report included a review of the Smart Building challenges the GSA faced and high-level recommendations the GSA could take to begin achieving Smart Buildings in their portfolio.

## EXECUTIVE SUMMARY

### Building Profile

- **Location:** 1800 F St NW, Washington, D.C.
- **Building size:** 724,000 square feet
- **Building type:** Government office
- **Owner:** The GSA

### Challenge

- Utilize Smart Building technology to enhance the occupant and facility management experience while reducing energy consumption in the newly renovated GSA Headquarters, which would adopt a new hoteling work structure

### Solution

- Work with the GSA in the early stages of the renovation to understand their challenges and objectives
- Define building technology requirements including a unifying platform to integrate all the building's systems and ensure all systems met those requirements
- Function as subject matter expert reviewing MSI proposals and hiring building technology contractor(s)
- Develop Smart Building Use Cases through strategic conversations with GSA stakeholders and commission Smart Building systems to ensure proper integration and sequencing to meet the Use Cases
- Implement system rollout and assist with tenant training and education

### Intelligent Buildings Services

- Actionable Strategic Consulting
- Smart Building Design Guidance
- Smart Building Program Management
- OT Cybersecurity Consulting

### Benefits

- Facilitated office transition to a hoteling work structure with building system responses that reinforce new workplace norms in the built environment
- Improved tenant satisfaction and choice within the workplace
- Increased space utilization and reduced energy use intensity
- \$24 million in rent and \$7.7 million in operational savings per year

724K  
SQ FT

\$7.7M  
SAVINGS P/YEAR

50%  
ENERGY EFFICIENCY

### Engaging IB to develop Smart Building solutions

Determined to begin implementing Smart Building technologies by transforming these high-level recommendations into specific technology strategies and requirements, in 2009, the GSA's Assistant Commissioner for Facilities Management engaged IB to develop Smart Building communication data and network standards for the entire GSA portfolio and turn the renovated headquarters into a Smart Building. Achieving Smart Buildings in the GSA portfolio came with considerable technical challenges including unique building control systems in every building and facility standards that did not ensure control system cross-communication. Additionally, the GSA facility management staff was apprehensive of adding more technology layers, with one staff member saying: "Too much complexity, or too many systems bundled together, will overwhelm our building contractors operations and maintenance resources."<sup>8</sup> With those concerns in mind, IB set out to develop a Smart Building solution that would improve the facility management team's day-to-day experience, enhance the occupant experience, and reduce energy use.

### Bridging work structures and the built environment with Smart Building integrated sequences

#### Improving building operations by giving facility managers more time to fix issues

IB's experience developing Smart Building strategy, Use Cases, and design allowed them to realize the GSA's vision of the future of Federal buildings and workplaces. IB began with the centralized platform that would be implemented by a master system integrator (MSI), to unify all the building systems, simplify operations, and enable cross-system functionality. IB created a formal MSI Request for Proposal and evaluated the capabilities of MSI proposal submissions.

The unified building control platform, as defined by IB, would not only deliver superior control of operational technologies but also positively impact the day-to-day experience of facilities managers. Many GSA buildings used a building automation system (BAS) with a single workstation that required facilities managers to descend to the lowest levels of a building to access the BAS. Furthermore, the BAS was comprised of multiple systems that required users to log in to each control system separately to view its data. With integrated systems in place, a facility manager would be able to remotely access the unified platform and view all the building's control systems in a single, secure interface. This shift would enable a dramatic increase in a facilities manager's productivity.

#### Shaping the Smart Building solution through strategic conversations

The construction for the GSA Headquarters needed to move forward quickly, and as a result, IB and the GSA prioritized defining requirements for a Smart Building solution before solidifying the Use Cases. The Use Cases, however, evolved through strategic conversations with the office of facilities management, Anthony Macri—Special Assistant to the Administrator on Workplace & Workforce Transformation—and representatives from other GSA departments.

Macri introduced the concept of workspace hoteling to the conversations, an alternative workplace strategy that would be implemented in the new GSA Headquarters, where some employees do not have permanent workstations. Employees without a permanent workstation simply reserve one when

they will be in the office. Using remote work policies and standard business travel to maintain a daily number of less than 2,200 in-office employees, a hoteling software would be used to manage employee workstations and conference rooms reservations.

Macri recognized the need for new workplace norms that emphasize accessible booking experiences and the punctual use of reservations for the workstation and conference room schedules to operate efficiently. Changing an entire building's office behavior is a monumental challenge, but it was essential for the hoteling structure to succeed, and by extension, for the entire headquarters renovation to succeed. IB crafted a novel solution that integrated the hoteling software with the building control systems to create dynamic building responses to reservations and occupant behavior.

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*The GSA knew they wanted a more efficient building and a better user experience. Using the IB Value Chain, IB ensured that the systems implemented focused on achieving those goals.*

– Mike Krall,

Director of Strategy, Intelligent Buildings

### Bringing a new workplace structure to life with Smart Building Use Cases

IB developed multiple Use Cases from these strategic conversations and outlined new workplace norms that would be reinforced in the built environment using building technologies. The Use Cases described human-building interactions in a set of seamless building responses to occupant behavior that signal and enforce the hoteling work structure norms using nearly fifty (50) unique integrated sequences developed by IB.

By integrating building control systems with the hoteling software, the building is aware of its occupant load and can adjust to maximize the occupants' experience and comfort using precise environmental control to achieve greater energy efficiency. For example, when an employee enters the building using their keycard, the hoteling software automatically checks them into their reserved workstation. This begins an integrated sequence: the lighting control system tracks their occupancy through the building, activating the local lights and HVAC in the reserved workstation's area if they are the first person to arrive. Employees reserve conference rooms through the hoteling software as well, which also coordinates with the building control systems. To reinforce scheduling, the lights remain off unless there is a reservation, and the lighting control system dims the lights to 10% five (5) minutes before a reservation ends. If a meeting ends early, the lighting system detects the lack of occupancy, turns the lights off, and communicates with the hoteling software to cancel the remainder of the reservation, allowing others to book the room for immediate use.

These high-impact and innovative Use Cases not only kept implementation manageable and further reduced energy use, but also provided a simple, long-term workplace structure reinforcement tool.

## Realizing the new GSA Headquarters workplace and its cost savings

### Implementing the Smart Building integrated sequences

Throughout the building technology bidding process, as the subject matter expert, IB evaluated proposals for their ability to provide the required technologies and services. During building technology installations, IB helped coordinate efforts to make sure that contractors had the information and access they needed to install equipment. IB also advised on the unified user interface regarding how and what information would be displayed. After construction on the renovation was completed, IB began programming and commissioning all fifty (50) Use Cases, validating that all the systems were sequencing correctly.

After programming, the work began for rolling out the Use Cases to the GSA employees, starting with IB overseeing the facilities team's training led by IBS, the MSI vendor. With the facilities team ready, the integrated sequences were rolled out to the building occupants in steps, wing by wing. Macri led the rollout in the office, working with IB to develop signage to succinctly explain the expected employee behavior and the building control response. Macri collected feedback from employees and then worked with IB and the facilities management team to improve any gaps in the integrated sequences. This workgroup replicated these steps across the renovated building, gathering further feedback and deciding whether to move forward to subsequent wings.

### Achieving energy savings in the GSA Headquarters renovation

Using the Smart Building technologies that had been unified with the hoteling software created a superior facilities manager and occupant experience while greatly reducing energy consumption. The building was so efficient that despite the 34% increase in occupant density after the renovation, the building's energy use intensity decreased from 86.6 kWh/ft<sup>2</sup>/yr before the renovation to 58.7 (as recorded in 2016)<sup>9</sup>. The total energy consumption reduced by 50%<sup>9</sup>, with 20–32% of that reduction estimated to be from efficiency improvements. Occupants also reported higher satisfaction with the indoor environment— including temperature, air quality, and light—compared to GSA building averages in a tenant satisfaction survey.<sup>10</sup>

The renovation of the GSA Headquarters saves the GSA \$24 million a year in real estate and \$7.7 million a year in operations and management costs<sup>11</sup>. The GSA Headquarters renovation successfully moved the GSA toward its legislative goals, demonstrating what the modern Federal workplace can achieve and remains an innovative example of the GSA's Smart Building and Total Workplace programs working in tandem.

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