Project Profile

The Hilton Americas-Houston Hotel Scores Energy-Savings Win with Unique Guest Room Climate Control

Enco showcased the power and flexibility of Andover's programming language, Plain English®, by designing a custom interface to Hilton's Room Management System and providing a unique three-mode sequence of FCU operation for guest room control.

The Hilton Americas-Houston Hotel is Houston's largest convention hotel. This contemporary $285 million, 24-story facility offers 1,200 guest rooms and over 91,000 square feet of meeting space. The hotel is owned by the City of Houston, developed by Hines, and engineered by HMA Consulting, Inc. Hilton Hotels Corporation operates the property.

The Hilton opened in December of 2003 — just in time to host the 2004 NFL Super Bowl fans and media, who were unaware that they were staying in the most energy-efficient hotel in the world! Together, Andover Controls and local Andover Representative, *Enco Systems, Inc.,* scored the ultimate touchdown when it comes to energy-saving guest room control!

System Interoperability and Smart Room Control Proposed

"*Enco* won the bid to provide the hotel's Building Management and Control System based on their impressive technical proposal," according to HMA's president, John Hatcher, P.E., C.P.P., who wrote the Division 17 BMCS specification for the project. "The client, the City of Houston, was quite impressed by *Enco*'s demo of their 'Smart Room Control' solution."

Enco proposed a *Continuum*® Building Management System for the entire hotel that would utilize a special three-mode sequence of operation for guest room Fan Coil Units (FCUs) and a customized Andover Controls *Smart Sensor* user interface in each room. Together they would provide the Hilton with a truly unique approach to hotel room control. The *Continuum* system would also interface to several other sub-systems in the hotel.

"*Continuum*'s ability to seamlessly communicate to third-party manufacturers and the full programmability of all levels of its controllers allowed us to meet the Hilton's interoperability requirements," comments Dan Travis, *Enco*'s Account Manager for

Andover Controls
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the Hilton Americas. "These features, along with our energy-efficient sequence of operation for the guest room FCUs, were key factors in *Enco* being awarded this project."

Energy-Efficient Rooms Provide Guests with Quality Air

An Andover Controls *Continuum* i2866 terminal controller controls FCU operation and is the power behind Hilton's guest room control. The i2866 modulates an Outside Air (OA) damper for each room to 50 CFM of *pre-treated* OA.

Typically, hotels use individual window units, each of which take in *untreated* OA or hallway air, cools or heats it, and then circulates it around the room. The Hilton, on the other hand, uses four outside air handling units (OAHUs) to *pre-treat* the outside air required for its 1200 guest rooms. The OAHUs take the major load off of the individual FCUs, which are concealed behind the wall in each guest room. The OA is pre-cooled to 55° F. during warmer, more humid days, and pre-heated to 75° F. on cold days using an OA reset schedule. Besides reducing the hotel's overall OA usage, the use of centralized outside air units insures the correct amount of fresh air for each room.

The *Continuum* i2866 also controls the variable speed fan on the FCU, reducing energy consumption by matching the fan speed to the room's needs. (The ECM motor on the fan is whisper quiet; ironically, something frequent hotel users can't help but notice.) The bathroom exhaust fan is interlocked to open when the guest room's FCU is running. (Each bathroom in the hotel has its own ducted exhaust.)

A small Andover Controls *Smart Sensor* is mounted on the wall near the door. This intuitive, four-button LCD display allows guests to change the temperature in their room's ±3° from set point.

The entire hotel is centrally controlled and monitored by an Andover Controls CyberStation® front-end workstation located in the hotel Operations offices. At anytime, the

Andover Controls Smart Sensor

workstation operator can override the fan coil operation in an individual guest room, an entire floor, or the entire building with a single command. For example, after carpets are treated, the operator may choose to maximize outside air circulation within those rooms.

Custom Three-Mode Sequence of FCU Operation

Enco showcased the power and flexibility of Andover's programming language, *Plain English*®, by designing a custom interface to Hilton's Room Management System and providing a unique three-mode sequence of FCU operation for guest room control:

"Unrented" mode:

The guest room is not rented:

- Heating set point is lowered to 65º F. and cooling set point is raised to 80º F.

- Room OA intake and bathroom exhaust air dampers are *closed,* substantially reducing energy consumption

"Rented, Unoccupied" mode:

As the reservations clerk checks a guest in at the front desk, the Hilton's Room Management System signals the *Continuum* system, which automatically prepares a room for occupancy:

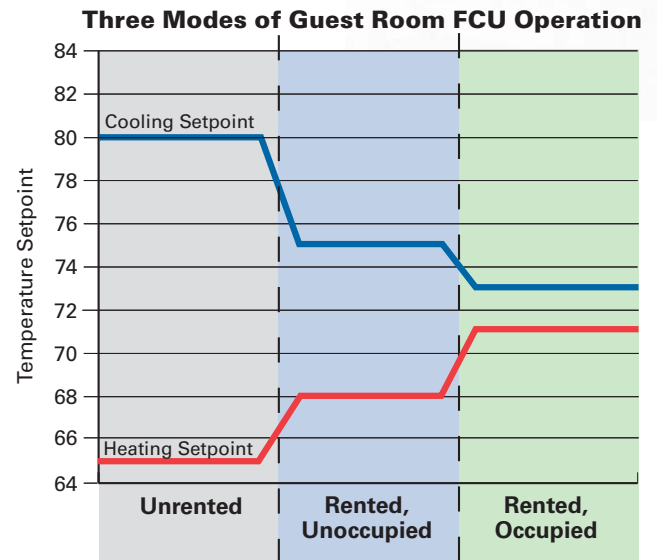- Set point is changed to 68º F. (heating) and 75º F. (cooling)

"Rented, Occupied" mode:

As the guest enters the room, a door contact tied into the *Continuum* system is activated. This is followed by the activation of a PIR motion sensor, located in the sleeping area. The *Continuum* system puts the room in "Occupied" mode:

- Set points are adjusted to the maximum comfort levels: 71º F. for heating and 73º F. for cooling

- OA damper modulates to maintain a constant 50CFM intake

- Bathroom exhaust damper opens fully

If the room's motion sensor does not detect movement within 30 minutes, the room will go back to a "Rented, Unoccupied" mode. This would occur if the occupant left his room temporarily. This control sequence is overridden between 12 midnight and 5am, when the system assumes that a lack of motion coincides with the occupant sleeping and maintains the room in a "Rented, Occupied" mode.

When a guest exits the room on his departure day, the door contact signals the *Continuum* system, which waits for movement via the motion sensor. When none occurs within 30 minutes, the room reverts back to "Rented, Unoccupied" mode until the guest checks out with the front desk. At this point, the Hilton's Room Management System signals the *Continuum* system that the room is then "Unrented", and the set points and dampers adjust accordingly.

Three Modes of Guest Room FCU Operation

Temperature Setpoint

Cooling Setpoint

Heating Setpoint

| Unrented | Rented, Unoccupied | Rented, Occupied |

Tamas Sebestyen, Director of Property Operations, adjusts the temperature in a Hilton guest room

Hotel Sub-Systems Interface with Continuum

The *Continuum* Building Management system also interfaces to several other sub-systems in the hotel, including switchgear, chillers, variable fan drives (air handling units, cooling towers, and pumps), UPS, fire alarm system, and back-up generators.

In addition, the Operations staff uses the system to control and monitor the HVAC and lighting in the hotel's public areas and meeting rooms. Tamas Sebestyen, Director of Property Operations for the Hilton Americas, appreciates the ease of use that CyberStation's graphical screens provide him for scheduling these areas.

"*Enco* created a user-friendly graphical screen for us to schedule temperature and lighting for the hotel's meeting rooms each morning. CyberStation also provides my staff with real-time information on each space in the hotel and the equipment that services it. Alarms are routed both to the workstation and our Nextel phones, so we can take the appropriate action quickly. We are still fine-tuning the system, but already I feel like we have unlimited capabilities!"

CyberStation workstation home screen

PROJECT AT A GLANCE:

Project Type:
HVAC, Lighting

Project Name:
Hilton Americas-Houston Hotel

Location:
Houston, Texas

Market Segment:
Hospitality

Number of Buildings:
1

Total Square Feet:
1.3M

Andover Equipment Installed:
21 – Network Controllers
2 – CyberStation Workstations
19 – SCX 920
19 – i2200 Infilinks
1,355 – i2866
103 – i2867
1,235 – Andover *Smart Sensors*

Network:
Fiber Optic LAN

Applications:
Temperature and Humidity Control
Lighting Control

Third-party equipment and/or drivers:
Trane Chillers (BACnet)
Danfoss Variable Frequency Drives (Modbus)
Hilton Room Reservations Database *(Plain English)*
General Electric Power Meters (Modbus)

Total System Points:
12,000+

Andover Controls Representative:
Enco Systems, Inc.

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