

# Project Profile

## Mechanical Systems are “All Aboard” at Union Pacific Headquarters



*“The Continuum control system provides precise control of the building’s numerous mechanical systems and interfaced equipment. Precise control equates to a comfortable interior environment and high operating efficiencies.”*

*Sam Gibson  
Senior Engineering Manager, Hines  
Union Pacific Center*

Union Pacific Corporation is one of America’s leading transportation companies. Its principal operating company, Union Pacific Railroad, is the largest railroad in North America, covering 23 states from California to Illinois. The company’s new \$260 million corporate headquarters building in Omaha, Nebraska, the *Union Pacific Center*, is a beautiful 20-story, 1.3 million square foot, glass exterior structure. In fact, it’s the largest office building in the state! The property, which was designed by Gensler and developed by Hines, was ready for occupancy in the summer of 2004.

With a focus on employee productivity, Union Pacific strives to provide a healthy and comfortable environment for its 4,000+ employees with amenities such as a fitness/wellness center, a state-of-the-art employee training center, and a 660-seat restaurant. Special attention is also given to ensure the workplace offers not only proper interior lighting and climate control, but also peace-of-mind in an area of the country where tornadoes are a concern. Behind the scenes, many building systems in the *Union Pacific Center* come together to make this happen.

### ***One Facility Management Systems Ties it All Together***

In a remarkable display of total building integration, this new corporate headquarters features a single Tour Andover Controls *Continuum*® facility management system that not only provides precise indoor climate control, but also centralized monitoring and control of the building’s 12 mechanical and electric subsystems.



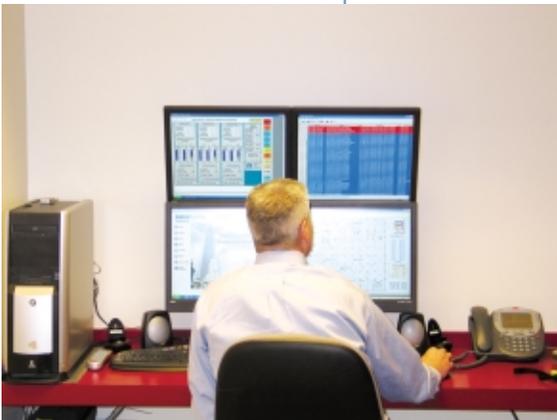
### Third-Party Systems Integrated into *Continuum*

Subsystem	Manufacturer
Lighting system	Lithonia
Chillers	Carrier
CRAC units	Data Aire
Power distribution units	PDI
UPS units	PowerWare
Variable speed drives	Rockwell Automation
Fire alarm system	Edwards
Fuel oil monitoring system	Earthsafe
Electrical systems	H.K. Scholz
Generators	Cummins
Storm shutter control system	Rollac
Window shade control system	Mechoshade

"We promoted the benefits of a *single, integrated system*," notes John Hatcher P.E., C.P.P. president of HMA Consulting, the DDC controls consultant who wrote the Division 17 BMCS specification for the *Union Pacific Center* project. "The *Continuum* facility management system communicates with the building's numerous subsystems using either a software driver or direct hard-wired connection."

Union Pacific's chillers, CRAC units, PDUs, UPS units, VFDs, fire alarm system, fuel oil levels, electrical system, and generators all communicate with *Continuum* using a Modbus driver; the Lithonia lighting system uses a BACnet I/P driver; and the storm shutters and window shades are controlled via a direct hard-wired connection.

According to Bob Danielson of *Controls Services, Inc.* the Omaha-based Tour Andover Controls Partner responsible for the installation, "*Continuum's* CyberStation front-end software package provides Union Pacific the transparent 'look and feel' they wanted — equipment alarms and status graphics from the 12 subsystems display on a *single* workstation. Additional hardware costs and the need to train operators on multiple proprietary front-ends are greatly reduced," adds Danielson.



**Sam Gibson monitors Union Pacific's building systems from a central CyberStation workstation**

The *Continuum* system includes 17 network controllers, 955 Infinet field controllers, and four CyberStation front-end workstations operating on an Ethernet LAN network. A redundant Ethernet network was installed for the company's Mission Critical Center and Data Center to insure that these two areas remain up and running 24/7/365. CyberStation wireless laptops, which are used by technicians to troubleshoot equipment throughout the building, round out this powerful control system. In addition, the built-in web server capabilities in the *Continuum* network controllers allow the building occupants and facilities staff to initiate after-hours HVAC requests using a standard web browser on their home or work PCs.

### *Under-floor Cooling System*

A typical floor at Union Pacific's Headquarters uses an under-floor VAV system for cooling with four air handling units on each floor. Nailor "swirl" diffusers, installed every ten feet in the floor, provide employees the ability to adjust the ventilation manually to meet their individual comfort levels.

Heat and supplemental cooling is supplied by perimeter fan coil units located in the ceiling, which supply air to offset warm/cold window temperatures. *Continuum* also controls the amount of conditioned outside air introduced into each floor based on carbon dioxide level sensors.

### **Shade Control Facilitates “Daylighting”**

The new *Union Pacific Center* features a 19-story glass atrium that allows every floor to receive maximum natural light. In addition, the building’s Mechoshade window shade control system facilitates effective “daylighting”, an important concept as Corporate America seeks solutions to increase worker productivity and decrease energy consumption through building design. Glare on CRTs, for example, has been cited as a cause for reducing the percentage of man-hours worked, lowering employee efficiency and response time, and raising worker stress and healthcare costs. In addition, according to the California Institute for Energy Efficiency and the U.S. Department of Energy, 77,000,000MWh of electricity are consumed in the United States each year for lighting buildings’ perimeter zones where daylight is already present. Daylighting using a window shade management system can reduce energy consumption and peak demand costs and reduce CRT glare, increasing comfort levels and thus worker productivity.

According to Danielson, *Control Services* is in the process of automating the window shades through the use of Tour Andover Controls *Plain English*® programs that will operate the window shades based on time-of-day or interior ambient light levels.



**Natural light streams through Union Pacific’s 19-story glass atrium. Mechoshade window shades facilitate Union Pacific’s “daylighting” strategies**

### **Storm Shutter Control Provides a “Safe Haven” for Employees**

Rollac motorized aluminum storm shutters are installed on the northwest corner of the building atrium, and are likewise controlled by the *Continuum* system. If a tornado is imminent, the CyberStation operator can click a button on the screen to roll down the shutters and block the glass, providing a “safe haven” for the employees on each floor. Data from the wind speed and wind direction sensors installed on the roof of the building is displayed on the CyberStation. If necessary, the workstation will send an alarm to the facilities staff of a potential threat.



**Storm shutters provide peace-of-mind for Union Pacific employees**

According to Sam Gibson, Senior Engineering Manager with Hines at the *Union Pacific Center*, “The *Continuum* control system provides precise control of the building’s numerous mechanical systems and interfaced equipment. Precise control equates to a comfortable interior environment and high operating efficiencies. The numerous CyberStations allow our engineering staff to access the control system

from throughout the facility. In addition, access via the wireless laptops greatly increases mobility. The control system can be accessed from my desk, the engineering control room, or anywhere within the facility.”



## PROJECT AT A GLANCE:

**Project Type:**

HVAC Control

**Project Name:**

Union Pacific Corporation Headquarters Building

**Location:**

Omaha, Nebraska

**Market Segment:**

Commercial Office

**Number of Buildings:** 1**Total Area:** 1.3 million**Andover *Continuum* Equipment Installed:**

17 – CX9900 Network Controllers

955 – Infinet Controllers

81 – System Controllers

698 – Terminal Controllers

170 – VAV Controllers

6 – Input Controllers

4 – CyberStation Workstations

4 – CyberStation Wireless Laptops

**Network:**

Ethernet LAN with backup fiber optic LAN

**Applications:**

HVAC Control

Lighting Control

Window Shade Control

Storm Shutter Control

Weather Station Monitoring

After hours HVAC web access

**Third-party equipment and/or drivers:**

Carrier Chillers – Modbus

Data Aire CRAC Units – Modbus

PDI Power Distribution Units – Modbus

PowerWare UPS Units – Modbus

Rockwell Automation VTAC9 VFD's – Modbus

Edwards EST3 Fire Alarm Interface – BACnet I/P

Earthsafe Fuel Oil Monitoring – Modbus

H.K. Scholz Electrical Systems – Modbus

Cummins Generators – Modbus

Rollac Storm Shutter Control

Mechoshade Window Shade Control

**Total System Points:** over 4,700**Tour Andover Controls Partner:**

*Control Services, Inc.*

TAC and Andover Controls and product names are trademarks of Tour Andover Controls. All other trademarks mentioned belong to their respective owners.  
Copyright © 2005, Tour Andover Controls,  
All rights reserved.

POF-UP-A



[www.tac.com](http://www.tac.com)

