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## Mission Critical Real Estat

## By Clair Jenkins and Kirk Anderson

t's one thing to talk about high technology in terms of bits and bytes. It's something else to build a truly high-tech building. One of the most forward thinking real estate projects in the country recently came on-line in Seattle. Fisher Plaza, owned, operated and developed by Fisher Communications, is not your typical project.

Fisher Plaza is a media, communications and mission critical facility. In other words, it is specially designed to provide a level of structural, mechanical and electrical infrastructure uncommon in other types of facilities. Its security, life-safety and other operating programs are tailored specifically to the demands of a mission critical environment. While the recent technology boom saw many old office and warehouse buildings converted to uses for which they were never originally



Fisher Plaza in Seattle provides a mission critical environment.

designed, Fisher Plaza represents a facility designed and engineered from the ground up to house the mission critical operations of any organization.

In addition, with the presence of television and radio media, and currently 10 different telecommunications network providers, Fisher Plaza is a place where an organization can access the world in a diverse manner. Satellite, terrestrial fiber and



copper, and various wireless networks are accessible for direct peering. The media production and postproduction capabilities also are readily available to help any organization enhance the effectiveness of communicating its messages to its constituencies.



One of the telecommunications control rooms at Fisher Plaza.

In short, Fisher Plaza is like a community, where the resources and capabilities of a number of different organizations are shared and leveraged for mutual benefit. The physical proximity of these resources creates some unique benefits for any organization located in Fisher Plaza. For example, the ability for an organization to directly peer with a variety of communications providers not only reduces the cost of each communications circuit, but also can provide tremendous flexibility, redundancy and diversity to a business. In the current political and economic climate, such capability can be important to a business' survival.

Fisher Plaza consists of two buildings linked by a four-level underground parking structure, which accommodates 700 cars. The 200,000 ft<sup>2</sup> (18 600 m<sup>2</sup>) Phase 1 opened in Summer 2000. Phase 2, an additional 100,000 ft<sup>2</sup> (9300 m<sup>2</sup>) building, is scheduled to open in Fall 2002.

Fisher Plaza matured out of Fisher's intensive investigation into its own needs and into the needs of organizations Fisher sees as synergistic with its future growth.

"We operate in a world where information is very important," explains Kirk Anderson, president of Fisher Media

Services Company, and one of the people behind Fisher Plaza. "From providing customer service to emergency response and recovery, maintaining the flow of information in our world can be critical to business and community survival. The infrastructure required to help organizations maintain and recover information flow is very costly and difficult to construct. Especially in the current economic and political environment, it is not only increasingly difficult for organizations to go it alone in capitalizing such infrastructure, the importance of decentralization to an emergency recovery strategy can make the task even more difficult.

"We felt that by making room for others in our infrastructure planning, we could gather around us synergistic organizations who also needed the same infrastructure, thus leveraging the investment and lowering the ultimate cost for everyone. In short, we are creating a community, a place where the whole can be greater than the sum of the parts."

In addition to Fisher's own television and radio operations, these community members include Tech TV, ABC News' west-coast bureau, Fisher Entertainment, Fisher Pathways, Civia Media Group, XO Communications, MCI/WorldCom,



Computer servers at Fisher Plaza.

ATT, Qwest Communications, Looking Glass Networks, Time Warner Telecom, Verizon Communications, and others.

With this in mind, Fisher Plaza's infrastructure is far different than most typical office buildings. The mission critical demands of the building's clients require that the building function 24/7/365 without exception. Hence, great

effort has gone into the planning and construction of the building's mission critical infrastructure to help ensure non-stop operation and speed of operations recovery for the organization.

In addition to utility-delivered electrical power, emergency power generators can provide up to 18 MW of fully redundant "N+1" emergency power. On-site fuel reserves allow the generators to run at full capacity for nearly one week without refueling to keep the building fully functional. Up to 100 W/ft<sup>2</sup> (1076 W/m<sup>2</sup>) of electrical capacity is available in Phase 1, and 200 W/ft<sup>2</sup> (2153 W/m<sup>2</sup>) for Phase 2.

Two on-site water wells supply Fisher Plaza with water for the HVAC systems and for potable purposes if City of Seattle water service is disrupted. The building is built to seismic Zone 3 – Essential Facilities requirements on undisturbed glacial till soils, which during an earthquake are not subject to liquefaction. Post-tension concrete construction provides superior seismic performance and a column-free interior, which allows flexibility in the layout and use of floor space.

The only "heliport" in the Seattle central business district is located on the roof. A heliport provides fueling capacity for aircraft, where a helipad allows only take-offs and landings.

Raised floors allow quick and easy reconfiguration of the building's HVAC, power and cabling systems to adjust to occupant needs. Underfloor HVAC, power and cabling, along with de-mountable walls and modular furniture systems offer ultimate flexibility and minimize the time to modify or bring a space into functional use.

The HVAC system for Fisher Plaza also is high-tech and state-of-the-art. Phase 1 has three large rooftop air-handling units. Chilled water for cooling is provided by three centrifu-



Screen shows an air-handling unit at Fisher Plaza.

gal chillers. Two cooling towers service the Phase 1 chillers.

Phase 2 has four chillers and its own cooling towers. Rather than rooftop air handlers, Phase 2 supports floor-by-floor airhandling units with evaporative sections for data floors to allow occupants to take economic advantage of the temperate climate in the Pacific Northwest. The system is designed to accommodate a phased introduction of air-handling capacity to each floor, allowing occupants to stage the growth of the infrastructure to their needs.

On top of what's in each individual building, an interconnect allows the two buildings to share chilled water capacity.

Located within the raised floor areas are modulating integrated terminal (MIT) units for cooling, and electric heat fancoil units are located around the perimeter for heating. Various building exhaust fans and other miscellaneous equipment make up the balance of the HVAC system. Due to the unique design of this system, rezoning of the mechanical system can be accomplished simply by moving a floor tile containing a diffuser to a new location in the raised floor. While more expensive up front, this saves significant cost and time in downstream tenant improvements.

The entire mechanical system is controlled by a buildingwide, native BACnet system, which serves as the building automation system. The backbone of this system is a high-speed, BACnet/IP Ethernet LAN on which hang the native BACnet server and operator workstations. Ten additional ports are provided for temporary laptop workstation connections, plus tenant workstations as may be desired.

Connected to the BACnet/IP Ethernet LAN are native BACnet/IP Building Global Controllers, which manage their

respective areas of the building. A BACnet MS/TP network connects the Building Global Controllers to native BACnet field controllers for all other HVAC equipment, such as the main air-handling units, cooling towers, VAV terminals, fan coil terminals, and exhaust fans. In total, approximately 279 BACnet field controllers are on the system.

An additional BACnet protocol gateway is connected to the Ethernet LAN to allow the building-wide BACnet system to integrate to the factory-provided chiller controllers.

The BACnet Operator Workstations provide full functionality to the system user, including 3-D animated graphics, and serve as a means to view and adjust all system functions, including time schedules, trend logs, alarms, alarm histories, and a complete view of each zone and individual mechanical equipment. The operator can also devise global control strategies or modify existing control algo-

rithms for any controllers using a graphical DDC logic programming software tool, and then download these programs to each controller on the system.

The BACnet system is fully distributed. The building global controllers are peer-to-peer and manage their own respective portion of the building. They provide global control functions and manage network traffic along with time schedules, trend

logs, alarms, and are fully standalone capable. The control logic for each controller is fully programmable.

The terminal unit controllers for the MIT and fan coil terminals communicate on the BACnet MS/TP network. The control logic for these devices also is fully programmable. There is one controller per terminal unit. As mentioned pre-

viously, the raised floor area throughout the building houses the fan coil and MIT units.

The operator workstation provides a graphical screen of all data associated with each terminal unit. The operator can monitor and adjust all parameters and schedules of the system.

The underfloor area supply air temperature is set at  $60^{\circ}$ F to  $62^{\circ}$ F ( $16^{\circ}$ C to  $17^{\circ}$ C), which provides the same cooling effect as  $52^{\circ}$ F to  $55^{\circ}$ F ( $11^{\circ}$ C to  $13^{\circ}$ C) air from a ceiling-mounted system. Therefore, Fisher Plaza's HVAC system is efficient and economical to operate, which is important given the large loads.

The main AHU controllers provide complete control of, among



Screenshot of a chiller at Fisher Plaza.

other items, supply air temperature reset, economizer, static pressure, ventilation dampers, variable frequency drives, and monitor total supply air cfm. The controllers can calculate the optimum "free cooling" available to minimize chiller load. Global control strategies are used by communicating with the terminal unit controllers to calculate the optimum supply air temperature. Mechanical cooling is used as a last resort.

'For example, the ability for an organization to directly peer with a variety of communications providers not only reduces the cost of each communications circuit, but also can provide tremendous flexibility, redundancy and diversity to a business.' BACnet controllers control the cooling towers. Global control strategies allow staging of the towers in reference to chiller load to minimize building energy. Full graphical screens are available at the workstation to adjust all points. Each piece of equipment within the building is integrated into one cohesive control system.

The building-wide native BACnet system is the latest technology available in the controls industry. BACnet/IP Ethernet LANs and modern graphical workstations provide the ability to tap into the latest technology. The BACnet protocol standard allows for integration of disparate manufacturers to connect devices into one single-seat system. Additionally, BACnet, as an ANSI/ASHRAE standard, will provide great longevity for the future.

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