

Radiant Delivers For Air Transport Hangar

This air transport firm takes over when “overnight” won’t do. They’ve delivered hearts on ice, special ops experts, rare animals, and radioactive payloads. A smartly assembled heating and snowmelt system at its Ohio hangar keeps performance high when temperatures get low.

BY JOHN VASTYAN

***Mission Critical:** Your assignment, should you accept it, is to airlift your cargo to a remote mountain air strip. Or to arrive at a major metro airport with celebrities, military high brass, or donor organs intact, with no time to spare. Gentlemen, start your engines. You’re already late.*

AirNet Systems, Inc. is the nation’s leader in the critical-time air delivery business. With just less than 1,000 employees, AirNet is much smaller than FedEx or UPS, but the company is geared for faster, more nimble service. Their fleet of 130 aircraft — based in LA, Seattle, Boston, Tampa and other cities all over the country — fly more than 600,000 miles weekly, guaranteeing that if tomorrow is just too late, their same-day service will get the delivery there today — anytime, anywhere, coast to coast, seven days a week, 365 days a year.

The firm specializes in time-sensitive cargo deliveries, though charter passengers, radioactive payloads, donor organs, five-star generals, CEOs, and Hollywood stars are also transported readily to thousands of locations nationwide. “It’s demanding work, and business is good,” said Joel Biggerstaff, AirNet’s chairman of the board and CEO.

When AirNet made plans to grow their hub facility operations in Columbus, OH, one of their first decisions was to design a new hangar for the air transport service firm. It would need to accommodate growth, be comfortable, energy-efficient, and *highly* functional.

Their vision came to life last spring after years of planning and two years of construction, enabling AirNet to consolidate the operations of three smaller facilities and to relocate its operations from Columbus’ main airport to Rickenbacker International, 15 miles to the south. The \$25 million project offered several advantages.

The new, 148,000-sq-ft facility also doubled its hangar space — now with an open area 350-ft by 150-ft in size — permitting larger aircraft to be loaded and unloaded inside, and provides valuable sorting space to ease congestion under-roof.

One of the key enhancements to the new facility is the extensive radiant heat and snow melt system installed by Columbus-based Muetzel Plumbing & Heating Co. to heat the immense hangar.

“Fortunately, the owners were predisposed to radiant for one key reason — comfort,” said Hanse Cromer, a heating expert with the manufacturer’s rep firm, Steffens-Shultz. “The rapid pace that their people work at is stressful enough. Warm floors and heat that would also gently warm the aircraft, as well, was perfectly suited to the need.

“With large sliding doors, and the possibility of more than one of them being opened at one time, heat within the facility will be flushed out quickly,” added Cromer. “But with radiant, the recovery time is fast, and most of the heat stays in the high-mass floor, and in the mass on the floor — the aircraft and stacked cargo, for instance.”

Radiant system planning and design for the enclosed space began many months before installation. Because of the floor’s great

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FIGURE 1. More than 55,000 lineal feet of radiant heating tubing was used at AirNet Systems new hub in Columbus, OH.

size, Muetzel (who especially enjoys piping layout and design), and experts from the project's general contracting firm, Ruscilli Construction Co., and Cromer settled on a plan that would create four separate, 13,250-sq-ft slabs, each measuring 75 ft by 150 ft.

For the extensive one-zone, seven-manifold system, the radiant design prescribed the use of 55,000 lineal feet of 3/4-in. RadiantPEX tubing manufactured by Watts Radiant. The system was designed to provide up to 25 Btu/sq ft. Each slab would have accessible, recessed sensors, and the entire system would be responsive to outdoor reset controls.

And, outside the hangar's four large bay doors, Muetzel crews also installed tubing for 10,000 sq ft of snowmelted concrete slab to streamline maintenance of the area immediately beyond the doors, and for easier maneuverability of taxiing jets and planes, even in the midst of winter's worst.

All arteries of the extensive indoor heating system — with a system volume of

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about 950 gal — lead to and from the strategically located mechanical room where, as the heart of the system are two, stacked 1.5 million Btu, fan-assisted, sealed-combustion Pennant boilers by Laars Heating Systems. The new units operate at 85% combustion efficiency and offer four-stage control to meet demand as needed, providing considerable energy savings.

In the larger Pennant models such as

these, where two ignition modules are used, each burner stage fires independently of one another. This design offers balanced airflow to each boiler's four firing stages, enabling operation as individual boilers. This permits each unit to continue operation without having to shut down the entire boiler.

"It's like having a greatly simplified lead-lag heat source," said Cromer. "If there

▶ High-Flying History

The 15,000-acre Rickenbacker International Airport is a high-speed logistics hub and cargo airport, a charter passenger terminal, a U.S. Foreign-Trade Zone, and one of the key economic engines of the central Ohio region, serving customer needs around the world.

The airport boasts more than 15% annual growth, and overall cargo activity has increased more than five-fold in less than a decade. Rickenbacker has parallel, 12,000-ft runways and currently includes 13 industrial parks, more than 25 million sq ft of development, and more than 100 companies, including cargo airlines, freight forwarders, logistics companies, corporate aviation businesses, manufacturers, and distributors.

The airport dates back to 1941. On December 8, the day after the Japanese attacked Pearl Harbor, the Army announced their plans to build the air base. Engineering and surveying work began the following month and the first tracts of land were purchased in April 1942. Also in April, Norfolk and Western Railroad began laying new mainline tracks along the western side of the base. "Lockbourne Army Air Base" opened in June 1942 as a glider and B-17 training facility.

After the war, flight-training activities were halted and the base was used as a development and testing facility for all-weather military flight operations. The primary unit at the base was the all-Black 447th Composite Group, also known as the Tuskegee Airmen. This unit merged with the 477th Composite Group in 1947, becoming the 332nd Fighter wing, one of the first all-Black flying units in the newly created United States Air Force. However, in June 1949, the 332nd was reassigned, the base was deactivated, and control transferred to the Ohio Air National Guard.

The base population grew further during the Vietnam War years of 1964-72, reaching an all-time peak of more than 18,000 service people in 1967.

In 1974, the base was renamed Rickenbacker Air Force Base in honor of World War I flying ace and Congressional Medal of Honor winner Eddie Rickenbacker, a Columbus native. After the Vietnam conflict, the number of Armed Forces personnel declined sharply. It was ultimately closed, then resurrected by private enterprise many years later.



FIGURE 2. Two 1.5 million Btu, fan-assisted boilers are at the heart of the radiant heating system. The units operate at 85% efficiency with four-stage control to meet demand.

would be failure of one of the ignition systems, the other takes over.”

All radiantly heated areas of the hangar were designed with an operating temperature of 109°F. The Btu load for the indoor system is 1,409 Mbtuh at 141 gpm with a 20°ΔT.

“The system was designed so that, at full heat load, all eight stages of firing would be used,” added Cromer. “And because the fully automated, idling radiant and snowmelt system would be in some stage of operation throughout the entire winter season, we pretty much eliminated the possibility of some unexpected winter condition catching them by surprise.”

The single-floor sensor — embedded in the slab — and snowmelt controls, are handled by a HeatTimer microprocessor control. The system was set to maintain a floor temperature of 80° to 82°. The technique was chosen because — with the large, opposing bay doors, which would occasionally be open at the same time during the winter season — it would be so difficult to maintain a specific air temperature.

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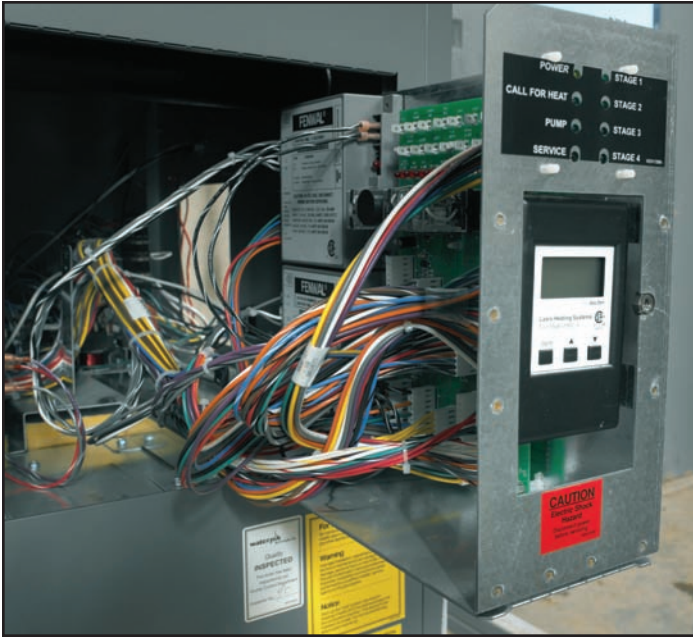


FIGURE 3. The boiler's front access panel with status lights, six-mode programmable control, and slide out tray allows the facilities staff at AirNet Systems, Inc. to easier access and more streamlined troubleshooting.

The digital control also monitors outdoor temperature and, at 36°, the snowmelt system is activated. The control is coupled with a three-way motorized valve. By design, the valve opens slowly until a prescribed supply-and-return ΔT is achieved. This gradual mixing of heated glycol solution into the snowmelt tubing prevents thermal shock to the slab.

The 350-gal snowmelt system was filled with a 40/60 mix using Dowfrost propylene glycol. This side of the hydronic feed was separated from the main indoor heating system through the use of a shell-and-tube heat exchanger. An outdoor-reset system sets system temperatures. For the most part, the hydronic system is set to idle throughout the winter months, with a fluid volume temperature set at 125° using programmed instructions to keep outdoor slab surface temperatures at a steady 35°. The Btuh load for the snowmelt system is 1,453 Mbtuh at 116 gpm and a 25° ΔT . The snowmelt system has three manifold locations.

There are seven bay doors, all of which roll on heavy steel rails. Two of the hangar doors have snowmelt areas that extend outside. "We were especially attentive to the need to melt any snow or ice around the door's base rail," said Cromer. "AirNet needed to open and close the doors quickly without interference."

There are also snowmelted areas beyond the other bay doors, areas where cargo is loaded inside and then transported by conveyor belts to loading areas outside. From these heated pads, cargo is then loaded onto carts for movement to the aircraft.

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For Muetzel Plumbing & Heating Co., the AirNet job extended over a period of about 10 months. Their role included hydronic installations, radiant heat and snowmelt, and placement of an extensive drainage system for the hangar area.

Indoor piping was placed for 20 6-in. floor drains that feed into a 20-in. PVC main. The drainage system was sized to meet the need of the hangar's vast fire-suppression system, which is always ready to dump high volumes of water-based foam should there be an emergency.

But the only emergencies that AirNet is contending with these days are the rigors of getting packages and people to distant places, when — as they slogan goes — every second counts. Through rain, sleet or hail, their new facility in Columbus will help them get the job done, on time. **ES**

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