

USS North Carolina Wilmington, NC



Project Details

- USS North Carolina Battleship
- Wilmington, NC
- Retrofit – VRF replaced a forced air system in the museum space and a number of individual window units
- System capacity – 20 tons
- Outdoor units – Heat Recovery
- Indoor units – 14 total (Ceiling Cassettes, High Wall)

“The original engineering specifications called for a traditional split system with forced air. That would have been really hard to squeeze in here... We really like that with this system the cassettes are in the ceiling. We’re really happy with the system”

**- Terry Kuhn
Maintenance Director, USS North Carolina**

Project Objectives

Infusing some much-needed comfort into one of North Carolina’s most prominent World War II memorials took a yeoman’s effort. Not only would the new HVAC system need to help preserve the historical accuracy and ambiance of the decommissioned ship, it needed to deliver comfort across a variety of load requirements while blending unobtrusively into the background.

- ability to heat and cool simultaneously to account for wide temperature differences on different sides of the ship
- Ceiling Cassettes shallow enough to fit unobtrusively into overhead spaces
- longer piping runs to keep outdoor units away from the touring public
- install flow selector boxes in overhead spaces without running separate power

Solution

Combining two heat recovery outdoor units and 14 indoor units, with system management provided by Lite-Vision Plus Remote Controllers, this Toshiba Carrier VRF heat recovery system is the perfect fit to deliver comfort to a battleship designed and built in the late 1930s. This floating relic of the Pacific theater includes a meeting space and museum area along with employee offices, a catering space and public restrooms, all in need of cooling and heating. The individual fan coil units – evenly split between Ceiling Cassettes and High Wall indoor units – provided the perfect balance between unobtrusive installation for aesthetics and quiet, comfort for hard-to-reach individual work spaces. Designed and installed by Jacksonville Heating Contractors with training and factory support from Carrier Enterprise, this system has helped bring a welcome breath of fresh air to an important monument of North Carolina’s and our Nation’s past.

Battleship Sets Sail for Comfort with Toshiba Carrier VRF



Project Synopsis

Preserving the historical accuracy of a World War II battleship while providing comfort for tourists as well as meeting / event clients proved to be a delicate balancing act. According to USS North Carolina Maintenance Director Terry Kuhn, “People are quick to point out non-World War II equipment. ‘Oh, they didn’t have THAT in the war!’ they’d say. But on the other hand, they are happy to have the air conditioning!”

Requirements for the installation included converting the ship’s Ward Room (officers’ dining room) into a meeting space and museum are that it retained a number of the ship’s original features. It also needed to provide heating and cooling for a catering room, the guest bathrooms and individual office spaces. The system had to be versatile, unobtrusive, and offer the ability to handle a variety of heating and cooling loads, simultaneously. Toshiba Carrier VRF was the clear choice, and Carrier got the project for a number of its competitive advantages.

VRF Sales Engineer Adam Slusher, of Carrier Enterprise, explained the choice of Toshiba Carrier VRF Ceiling Cassettes for the meeting space / museum, “We went with the Cassettes because of aesthetics. Ours are not as deep as our competitors, so they are more pleasing to the eye.” Another advantage of the Toshiba Carrier VRF system was the ability to put the Y-pipes in a central location and making longer pipe runs throughout the ship. This allowed the technicians from Jacksonville Heating Contractors to install both of the outdoor units on the starboard side of the ship in an area not seen by its visitors.

The ship’s physical constraints and the fact that it sits in water created additional challenges that played into the advantages of Toshiba Carrier VRF and the expertise of Jacksonville Heating Contractors. According to Slusher, the Toshiba Carrier VRF flow selector boxes for the heat recovery system provided a distinct advantage over competitive systems because they were small

enough – about the size of a toaster oven – to fit into the overhead spaces. They also were installed without running additional wiring because they could be powered by the nearest head unit.

Regarding the physical challenges of the ship, Jacksonville’s Randy Ramsey indicated that, “dealing with condensate was a bigger issue than refrigerant.” So a number of condensate pumps were installed. Glenn Davis, one of Jacksonville’s lead technicians described an unusually heavy amount of



drilling needed to run refrigerant piping and difficulty leveling the Ceiling Cassettes due to the ship’s motion. To account for the ship’s port holes and other interior obstructions, custom-fabricated mounting brackets were needed to install the High Wall units in their optimal locations. “It was a challenging job, but we conquered it,” said Davis.



Now that the installation is complete, employees of the battleship are more comfortable and more productive due to the extremely quiet High Wall units that replaced noisy wall units in their offices. “These new units make almost no noise whatsoever,” says Kuhn. “I don’t really know if we’ve had to run heating and cooling at the same time, but I really don’t have to worry about it. If my office is too hot, I turn it down. If I’m too cold, I bump it to heat... the system just takes care of it.” And as plans for future usage of additional spaces materialize, the Toshiba Carrier VRF system gives Kuhn and the staff the flexibility they need to add additional indoor units as needed.



For Ramsey, who remembered the grassroots fundraising campaign that saved the mothballed battleship from being scrapped in the late 1950s, it was an emotional journey as well. “To walk on this ship and see what other guys did in 1943, 1944... they had no air conditioning... they were in the South Pacific... they only had ventilation. And for me to have the pleasure to work on this ship, it was a great honor. The whole team felt the same way.”