

# U.S. Military Academy Picks Radiant for New Barracks

**Story by Mike Flenniken**

**T**he United States Army is going radiant.

Work is under way on a 287,000-square-foot barracks at the United States Military Academy at West Point, N.Y., that will feature a radiant heating and cooling system as well as a solar hot water system.

The six-floor structure will house 650 Cadets in two-person rooms and will include bathrooms and showers, laundry facilities on each floor, day rooms, office areas, study and collaboration rooms, trash and recycling areas, and offices and storage rooms. All

first-year Cadets, as well as a number of second-years, have been living three people to a room, and officials have cited that as a possible reason many have become ill and missed classes.

Each room will be 300 square feet, and the building will be divided into four major zones. The outdoor air temperature will determine whether each particular zone is in heating or cooling mode, and the flow of liquid in each room is based on the temperature setting. The hot water that runs through the Cadets' rooms will be 110 degrees Fahrenheit, as opposed to 58 degrees for chilled water.

Each room also will have its own temperature control, and will include a switch that turns

the system off when a window opens. The building will be Leadership in Energy and Environmental Design (LEED) Silver certified.

Despite using new technology, the new barracks will maintain the military gothic revival architectural style that is consistent with surrounding buildings.

During a recent conference call between officials from the United States Army Corps of Engineers (USACE), New York District — which is building the new barracks — the Radiant Professionals Alliance and IAPMO, USACE Design Manager Jeffery Friese said the goal is to achieve “net zero” status in the Cadet area. He said the U.S. Army Construction Engineering Research Laboratory (CERL) was brought in to support West Point in that effort, and was involved in the planning and early design stages. Friese said CERL brought the idea of radiant heating and cooling for a portion of the building to the table.

“The reason we went radiant heating and cooling was we had a strict energy intensity target of 56 kiloBTUs of use per square foot per year — the building is real tight, we’re calling it a net zero-ready building — so to get to that energy use intensity we needed to do something unique and radiant heating and cooling use a lot less energy than standard,” he said.

Friese said that on a good day, the system will supply 100 percent of the potable hot water demand. In the future, he said, they may even be able to pump the water into the main distribution system to other barracks.

USACE officials said they looked for examples of similar systems that are now in use, and the closest they could find was at Dartmouth College in New Hampshire.

“We went to Dartmouth College — they’re using it — and we walked in the dormitory and it was comfortable,” Friese said. “No noise, comfortable, and they’ve had good success with it. So we were pleasantly surprised and it made us more comfortable.

“They’ve been operating for seven years, and they get calls now from multiple colleges wanting to walk through — more for the radiant cooling, I’m more focused on that

because radiant heating is a tried and true,” Friese added. “To you all, radiant cooling is probably tried and true, but to a lot of people around here it just seemed like a bridge too far, and a lot of folks were not too comfortable with us going in that direction.”

Friese called the new barracks a “21st-century building,” which will be a concern to some people given that budgets for installation cost have decreased, the size of maintenance staffs has dwindled and maintenance staffs are not always up to date on the latest technology.

“We listened and considered that, but energy is the utmost important in the Army — and it’s only a third of the building — but it saves about \$300,000 a year off the energy bill for this building, and so the Army chose to stick with this and I think it’s going to be a great showcase project once it’s done,” he said.

Mark Eatherton, executive director of the Radiant Professionals Alliance, agreed.

“It sure will,” he said adding that people will most likely gravitate toward the radiant-cooled barracks portion of the building, as there will be a noticeable difference between that and the convectional convective cooling system that will service the other portions.

“At least that’s been my experience, is that conventional convective cooling is actually too cool, and I hope they realize that, ‘You know what? We really shouldn’t limit these just to the barracks areas; we should be using this everywhere,’” he said.

“You know, it’s interesting,” Friese said. “They’re renovating all the other barracks and they’re going to standard fan coil units in all the other barracks, so this building will stand out from size and technology.”

Construction team leader Matthew Ludwig said that since students, as they progress through the academy, don’t necessarily stay in the same building the entire time, they will be a valuable tool for comparing the difference between radiant heating/cooling and more traditional methods.

“At the end, when the buildings are all renovated, there will be Cadets that will go through our building and will go through a traditional fan coil style building,” he said,



“so I think we’ll be able to use them and ask them, and do an actual study based on how people feel.”

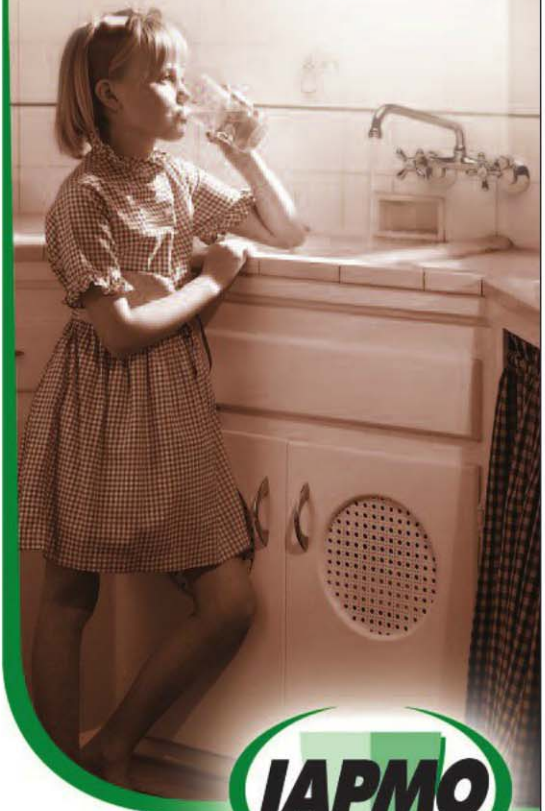
Eatherton responded, “Yeah, the human physiology portion of that is really subjective, but it’s still very important data.”

“I think it’s a very large component in that,” Ludwig said. “One of the big decision points in this is people come in from the hot air and they want to instantly feel that cold, and one of our arguments was, ‘Just because you feel air blowing on you does not necessarily mean the room temperature is changing,’ so that was a big discussion point.”

Completion is expected by summer 2016, with occupancy slated for the end of the year or beginning of 2017. 📷

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