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Safeguarding Through Design

The expanding 308th Guardian Angel Squadron at Patrick AFB, Fla., needed a new facility that would meet its unique training and equipment requirements.

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The 308th Guardian Angel Squadron, located at Patrick AFB, Fla., has a uniquely critical and growing mission with the Department of Defense. This squadron of Combat Rescue Officers, Para-Rescue Jumpers, and Survival, Evasion, Resistance and Escape Specialists is dedicated to lifesaving recovery missions during peacetime and war, and is called upon to provide aid to civilians before, during and following natural disasters.

Due to substantive growth in its number of personnel, the Guardian Angel Squadron required a new facility to carry out its varied mission responsibilities. What had been a 25-member unit had expanded to more than 100 members, and the existing support structure was no longer large enough or functionally appropriate to its personnel or mission. More indoor space was needed for the squadron's training activities and storage requirements—and it all needed to be protected from an extreme environment.

In 2017, the joint venture of Woolpert and RS&H was commissioned to design a facility that would serve the squadron's standard and specialized functions—from warehouse to training to office spaces to a 100-ft parachute drying tower and a training pool. The building would be a home base for the asymmetrical needs of a reserve unit and stand up to the hurricanes, flooding and corrosion that come with residing close to sea level alongside the Atlantic Ocean.

To accommodate these needs and to meet military specifications for security and sustainability, the new building incorporates resilient design strategies that will promote its function and withstand adverse weather in a single 63,600-ft² space.

PARACHUTE DRYING TOWER

The building's most distinctive space, which drove other design decisions, is a 100-ft tall parachute drying tower. The tower will be capable of drying as many as 100 parachutes within a 24-hour period to keep up with training and prepare for the next mission.

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The tower design required a basin that would facilitate rinsing saltwater or dirt out of wet parachutes, which can weigh up to 200-lb and are then hooked onto a hoist and raised to the top of the tower for drying. A mechanical room next to the tower will store an HVAC unit that directs hot air through a short span of ductwork to nozzles aimed at the suspended parachutes. The tower's steel frame, with 2-in metal panel construction, was designed to be economical and compliant with building codes for high wind-speed regions with wind-borne debris.

HURRICANES AND SALT WATER

Patrick AFB is located on a barrier island, with the Atlantic Ocean to the east and the Banana River saltwater estuary to the west. Certain design decisions for the Guardian Angel Facility were driven by vulnerability to hurricanes and flooding, and the certainty of damage to equipment and building materials from corrosive salt water. The finishes for the structure, which is located 30-yd from the ocean, were selected appropriate to Florida's environment. Aluminum or stainless steel were selected for all exposed metal. Much of the building will have a textured acrylic finish due to its resilience in highly humid and corrosive conditions. The modified bitumen roof has clay tile accents in accordance with the 45th Space Wing's Facilities Standards Guide for Patrick AFB.

Construction alternatives, including tilt-up and pre-cast construction, were carefully considered, but designers chose insulated concrete form (ICF) construction. ICF provides strong structural and thermal performance, while a membrane vapor barrier that adheres to the bottom of the concrete slab keeps water from infiltrating the building through the ground. The local market also was carefully researched to ensure that the contractors had experience with and would bid on ICF construction.

Tracks for a modular flood gate system were designed into the frames for all overhead and pedestrian doors into the building. Users can install the gates, which come in panelized sections, into each door before a storm. The modular system was chosen so that gates could be stacked to 3-ft high, and more gates can be added if needed.

Recognizing that water infiltrating the parachute tower would not cause damage and could be dried out, the team also designed flood-proofing between the tower and the adjacent large equipment storage area. The gates were designed into the door connection between the main building and the parachute tower, instead of at the parachute tower's exterior door.

INCREASING RESILIENCY

Within the project's program and budget, the design team weighed the lifecycle cost of increased resiliency with the potential savings gained through risk reduction from extreme weather events. However, quantifying the cost benefits of resiliency or risk reduction to justify additional construction costs is a recognized need in the industry.

CONDUCTING TRAINING DIVES

One of the unique needs of the 308th Guardian Angel airmen is a training pool for conducting diving and physical fitness exercises, which enables them to consistently be ready to deploy. Using the base pool or going elsewhere has proven inconvenient and costly due to the extensive training required.

A newly designed, 18-ft deep training pool will be placed partially below grade atop a concrete base. Raising the pool will account for water table and environmental concerns, while addressing security issues by limiting unauthorized access. Stairs and a hoist system to lift rafts or other training equipment were added to the design, along with a sustainable system for cleaning and maintaining the pool without excess chemicals.

Collectively, Guardian Angel airmen, USACE, and the design team were hard-pressed to put a number on the replacement cost of equipment or to the savings to the government of preventing flood damage. While this made it difficult to do a lifecycle cost analysis to justify resiliency upgrades, in this case, the project budget supported the measures. The value was recognized in protecting the expensive equipment stored in the building, the personal gear of unit members, a weapons vault, and three unit type codes of deployable equipment.

HONORED TO SUPPORT

Throughout the project, the designers worked in coordination with personnel at Patrick AFB, members of the Guardian Angel Squadron and USACE Louisville District to ensure their needs will be met.

The members of the joint venture who designed the facility said it was an honor to serve those who make the difference between life and death for so many. Construction is expected to be completed in 2020.

A visual tour of the rendering can be found [here](#).

To address potential high-water events for the facility, which is 5-ft above sea level, the design team in collaboration with Guardian Angel airmen and the U.S. Army Corps of Engineers (USACE) chose to provide flood-proofing to 3-ft above the finished floor in the event of an 8-ft storm surge. The offices and training spaces with additional windows were located on the west side of the building, away from the ocean, and all windows are at least 3-ft above the finished floor.

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