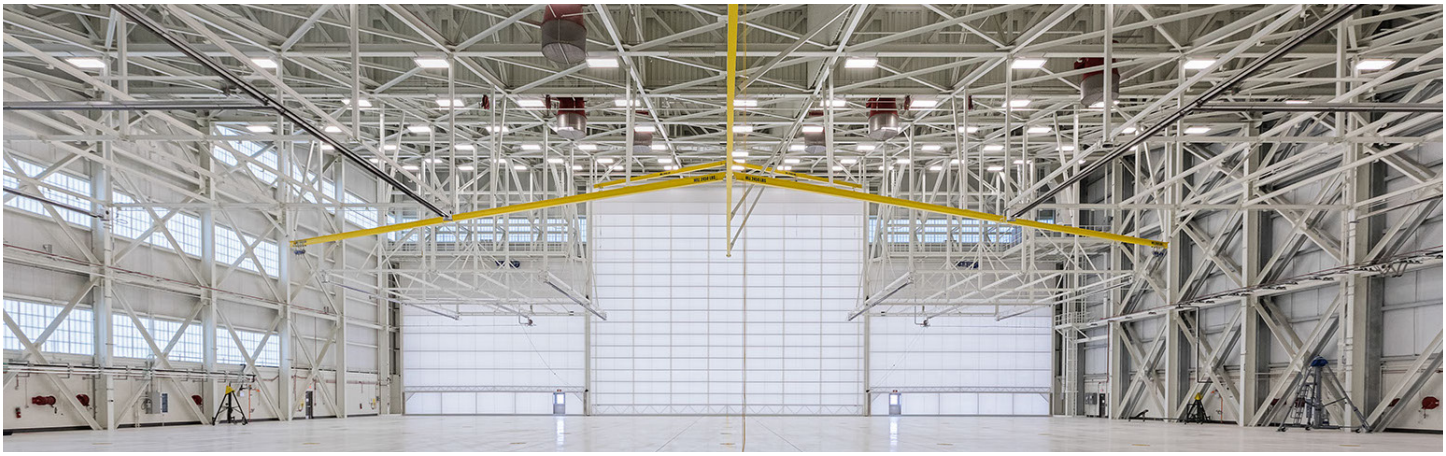
CASE STUDY

A New Aircraft Offers Both Challenge and Opportunity

Designing for the KC-46A meant creating the necessary space and infrastructure without having a physical aircraft to reference.



Challenge

With a wingspan of more than 157 feet and a length of more than 165 feet, the Boeing KC-46A Pegasus is the Air Force's largest and most complex aerial refueling and military transport aircraft to date. McConnell Air Force Base near Wichita, Kansas, was designated as the first main operating base for 36 of these new aircraft, requiring that a hangar be designed to accommodate the necessary operations and maintenance.

The sheer size of the aircraft presented issues of its own, but the fact that a model of the aircraft did not exist at the time made the design more challenging. The new facility would need doors and open spaces large enough to allow ease of mobility for crews and equipment during servicing and repairs, as well as foundations strong enough for aircraft jacking to conform to the airframe manufacturer's recommendations.

Project Stats

Client

U.S. Army Corps of Engineers, Kansas City District

Location

McConnell Air Force Base

more than

164K

square feet of facilities

clear span of

205

feet

approximately

$10M

under construction budget

Solution

Our team was retained to provide all disciplines for several of the facilities involved in the beddown at McConnell in support of the U.S. Army Corps of Engineers (USACE), Kansas City under an indefinite delivery contract task order with USACE Mobile. Planning and design of the General Purpose Maintenance Hangar required the consideration of several factors.

Life Cycle Cost Analysis

We conducted life cycle cost analyses to evaluate multiple facility systems to offer value to the Air Force throughout the project. Systems such as the hangar door design, heating and cooling systems for both the hangar spaces and occupied spaces of the facility, and power and compressed air systems were weighed against one another to determine the most costeffective option.

Site Development

Stormwater management for the site included meeting LEED, EISA and Mid-America Regional Council Manual of Best Management Practices with bioretention basins and reduction in paved surface areas. Realignment of the fuel transfer lines and hydrant pits required the existing hangar apron access to be relocated and to meet loading criteria for the new aircraft. Additionally, our team completed the siting phase in the face of obstacles such as campus coordination and a continually active apron with an ongoing mission.

Sustainable Design

Designed for LEED Silver certification, the hangar required energy efficient design elements, such as vertical-lift fabric doors with translucent panels to bring natural light and warmth into the space.

Fire Protection

Fire protection systems within the hangar needed to provide enough high-expansion foam to cover the approximate 150,000-square-foot space. Nine foam generators can deliver 20,300 to 28,800 cubic feet per minute of foam. A fire pump house within the hangar includes associated fire pumps and exterior above-grade water storage tanks to support not only the three-bay hangar, but also the one- and two-bay hangars developed by other firms for the beddown.

Results

The resulting 150,000-square-foot, three-bay hangar meets LEED Silver certification, exceeding the American Society of Heating, Refrigerating and Air-Conditioning Engineers' requirements by 47.5 percent. With construction costs coming in at nearly $10 million under budget, our efforts to provide value engineering and cost-effective solutions to the Air Force were successful, offering a space for the new aircraft and an upgraded maintenance and operations space for other wide-body aircraft, including the C-17, KC-135 and KC-10.

Services Provided to Main Operating Base 1:

- SIMs
- T/W delta programming
- ATCT
- Deicing pads
- Area development planning
- Space utilization plan

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